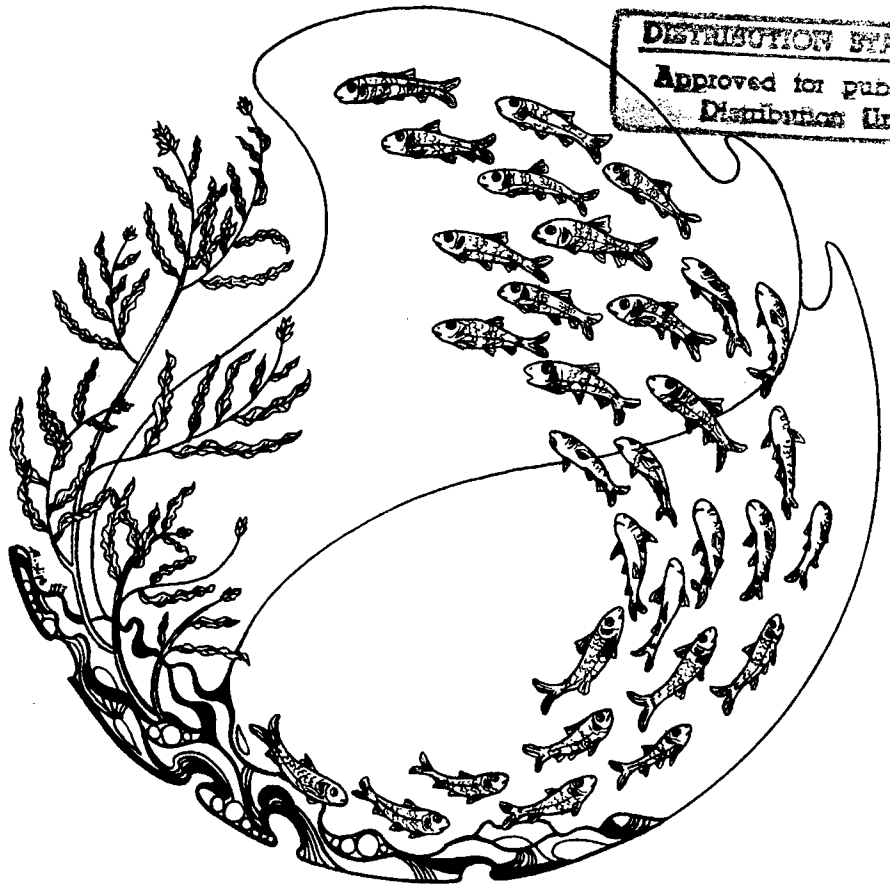
Long Term Resource Monitoring Program

Program Report
97-P006

1992 Annual Status Report

A Summary of Fish Data in Six Reaches of the Upper Mississippi River System



December 1997

The Environmental Management Technical Center issues LTRMP Program Reports to provide Long Term Resource Monitoring Program partners with programmatic documentation, procedures manuals, and annual status reports.

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1992 Annual Status Report

A Summary of Fish Data in Six Reaches of the Upper Mississippi River System

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Preface

This report is a product of the Long Term Resource Monitoring Program (LTRMP) for the Upper Mississippi River System. The LTRMP was authorized under the Water Resources Development Act of 1986 (Public Law 99-662) as an element of the U.S. Army Corps of Engineers' Environmental Management Program. The LTRMP is being implemented by the Environmental Management Technical Center, a U.S. Geological Survey science center, in cooperation with the five Upper Mississippi River System (UMRS) States of Illinois, Iowa, Minnesota, Missouri, and Wisconsin. The U.S. Army Corps of Engineers provides guidance and has overall Program responsibility. The mode of operation and respective roles of the agencies are outlined in a 1988 Memorandum of Agreement.

The UMRS encompasses the commercially navigable reaches of the Upper Mississippi River, as well as the Illinois River and navigable portions of the Kaskaskia, Black, St. Croix, and Minnesota Rivers. Congress has declared the UMRS to be both a nationally significant ecosystem and a nationally significant commercial navigation system. The mission of the LTRMP is to provide decision makers with information for maintaining the UMRS as a sustainable large river ecosystem given its multiple-use character. The long-term goals of the Program are to understand the system, determine resource trends and effects, develop management alternatives, manage information, and develop useful products.

Data (factual record) and information (usable interpretation of data) are the primary products of the LTRMP. Data on water quality, vegetation, aquatic macroinvertebrates, and fish are collected using a network of six field stations on the Upper Mississippi and Illinois Rivers. Analysis, interpretation, and the reporting of information are conducted at the six field stations and at the Environmental Management Technical Center, the operational center of the LTRMP. Informational products of the LTRMP include professional presentations, reports, and publications in the open and peer-reviewed scientific literature.

This document is an annual status report for 1992, containing a synthesis of data from fish populations and communities in the Upper Mississippi River System. This report satisfies, for 1992, Task 2.2.8.4, *Evaluate and Summarize Annual Results* under Goal 2, *Monitor and Evaluate the Condition of the Upper Mississippi River Ecosystem* as specified in the Operating Plan for the Long Term Resource Monitoring Program (USFWS 1993). This report was developed with funding provided by the Long Term Resource Monitoring Program. The purposes of this annual synthesis report are to provide (1) a systemwide summary of data in standardized tables and figures, and (2) initial identification and interpretation of observed spatial and temporal patterns. The primary data summarized in this report are available from the Environmental Management Technical Center.

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Abstract

The Long Term Resource Monitoring Program (LTRMP) completed 2,221 collections of fishes from stratified random and permanently fixed sampling locations in six study reaches of the Upper Mississippi River System during 1992. Collection methods included day and night electrofishing, hoop netting, fyke netting (two net sizes), gill netting, seining, and trawling in select aquatic area classes. The six LTRMP study areas are Pools 4 (excluding Lake Pepin), 8, 13, and 26 of the Upper Mississippi River, an unimpounded reach of the Mississippi River near Cape Girardeau, Missouri, and the La Grange Pool of the Illinois River. A total of 56–70 fish species were detected in each study area. For each of the six LTRMP study areas, this report contains summaries of: (1) sampling efforts in each combination of gear type and aquatic area class, (2) total catches of each species from each gear type, (3) mean catch-per-unit of gear effort statistics and standard errors for common species from each combination of aquatic area class and selected gear type, and (4) length distributions of common species from selected gear types.

Introduction

The objective of this report is to summarize key features of fish populations and communities from samples collected by field stations of the Long Term Resource Monitoring Program (LTRMP) from the Upper Mississippi River System (UMRS). The fisheries component of the LTRMP is charged, in part, with monitoring and reporting trends in the status of selected fish populations and fish communities of the UMRS (USFWS 1993). Intended as a data summary, this report contains only minimal descriptive syntheses. The LTRMP is required to produce trend reports at 5-year intervals that contain quantitative analyses and systemic syntheses of temporal changes. Further, the LTRMP uses these monitoring data in analyses to address specific issues of concern to LTRMP partners; these analyses are reported in special reports and in the open scientific literature.

Fish are the primary biotic object of recreational and commercial use on the UMRS. During 1982, UMRS fisheries provided more than 8.5 million activity days of sportfishing that generated more than $150 million in direct expenditures (Fremling et al. 1989). Commercial fisheries of the UMRS were valued at more than $2.4 million in 1987 (UMRCC 1989). Adverse trends in fisheries of the UMRS would have detrimental effects on recreation and the regional economy. Therefore, it is important to detect any adverse trends as they occur so that remedial actions can be considered.

Monitoring of and research on fish are also important because fish often affect other ecosystem elements. Although documentation of the effects of fish on other biota is derived primarily from lakes and reservoirs (Northcote 1988), and traditional thought maintains that the dynamics of river biota are influenced primarily by abiotic factors, recent evidence shows that the dynamics of fish assemblages in temperate rivers are regulated in part by biotic factors (Welcomme et al. 1989). Fish may exert influences on other biota in riverine ecosystems and may, therefore, be of broad ecological importance. For example, evidence shows that common carp (*Cyprinus carpio*), an abundant species in the UMRS, may depress or even eliminate macrophytes either

through uprooting or disturbance of substrate (Cahn 1929; Macrae 1979). Effects of fish on benthic macroinvertebrates are well known (Northcote 1988). Therefore, trends in abundance of fish may be crucial in explaining trends in abundance of other riverine biota.

Resource monitoring is an important component of long-term ecological research on processes governing large-scale ecosystems. It is nearly impossible to perform experimental manipulations of the UMRS on large spatial scales and to incorporate replication. Long-term data from standardized sampling programs that span natural or anthropogenic disturbances are the only means for gaining an understanding of large-scale processes governing large river systems (Sparks et al. 1990). Further, the LTRMP fisheries component will provide support for the formulation and investigation of research hypotheses concerning smaller scales using focused experimentation. Therefore, the combination of routine monitoring coupled with more intensive investigation of consequences of disturbances and experimentation at reduced spatial and temporal scales is the only available means for better understanding the UMRS and for identifying viable management alternatives.

Study Areas

The LTRMP study areas include six river reaches within the Upper Mississippi River System, five on the Mississippi River and one on the Illinois River (Figure). Study areas are referred to herein by the navigation pool designations according to the U.S. Army Corps of Engineers lock and dam system. Mississippi River navigation pools studied are Pool 4 (river mile 752 to 797), Pool 8 (679 to 703), Pool 13 (523 to 557), Pool 26 (202 to 242), and an unimpounded, open river reach (29 to 80). The remaining study area is the La Grange Pool of the Illinois River (80 to 158).

The LTRMP study areas were chosen, in part, to reflect important differences in geomorphology, floodplain land-use practices, and navigation management strategies that exist within the UMRS (Table 1). Pools 4, 8, and 13 are located in an upper impounded reach characterized by high percentages of open water and aquatic vegetation and low agricultural use (Figure). Relatively high percentages of the total aquatic area in these study reaches are composed of contiguous (to the main channel) backwaters, and relatively low percentages are composed of main channel (Table 1). Qualitatively, Pools 4, 8, and 13 are geomorphically complex and richly braided by side channels and backwaters. Pool 26, in a lower impounded reach, is characterized by relatively low percentages of open water and aquatic vegetation and a high percentage of agriculture in the floodplain. A low percentage of the total aquatic area is composed of contiguous backwaters, and commensurately, a high percentage is composed of the main channel. The Open River study reach is characterized by low percentages of open water and aquatic vegetation and 71.5% agriculture in the floodplain. Of the total aquatic area in the Open River study reach, only 1.8% is contiguous backwater and 79% is main channel (Table 1). The La Grange Pool is similar to Pool 26 in floodplain composition, but is similar to Pools 8 and 13 in composition of the aquatic area (Table 1). In fact, the La Grange Pool has the greatest percentage (52.2%) of contiguous backwaters among the six LTRMP study areas.

Sampling sites are randomly selected within nine strata for each study area: backwater contiguous shoreline (BWCS), backwater contiguous offshore (BWCO), channel trough (CTR), impounded shoreline (IMPS), impounded offshore (IMPO), main channel border unstructured (MCBU), main channel border wing dam (MCBW), side channel border (SCB), and tailwater (TWZ). The definitions of sampling strata are based on geomorphic regions that have been mapped and entered into a Geographical Information System.

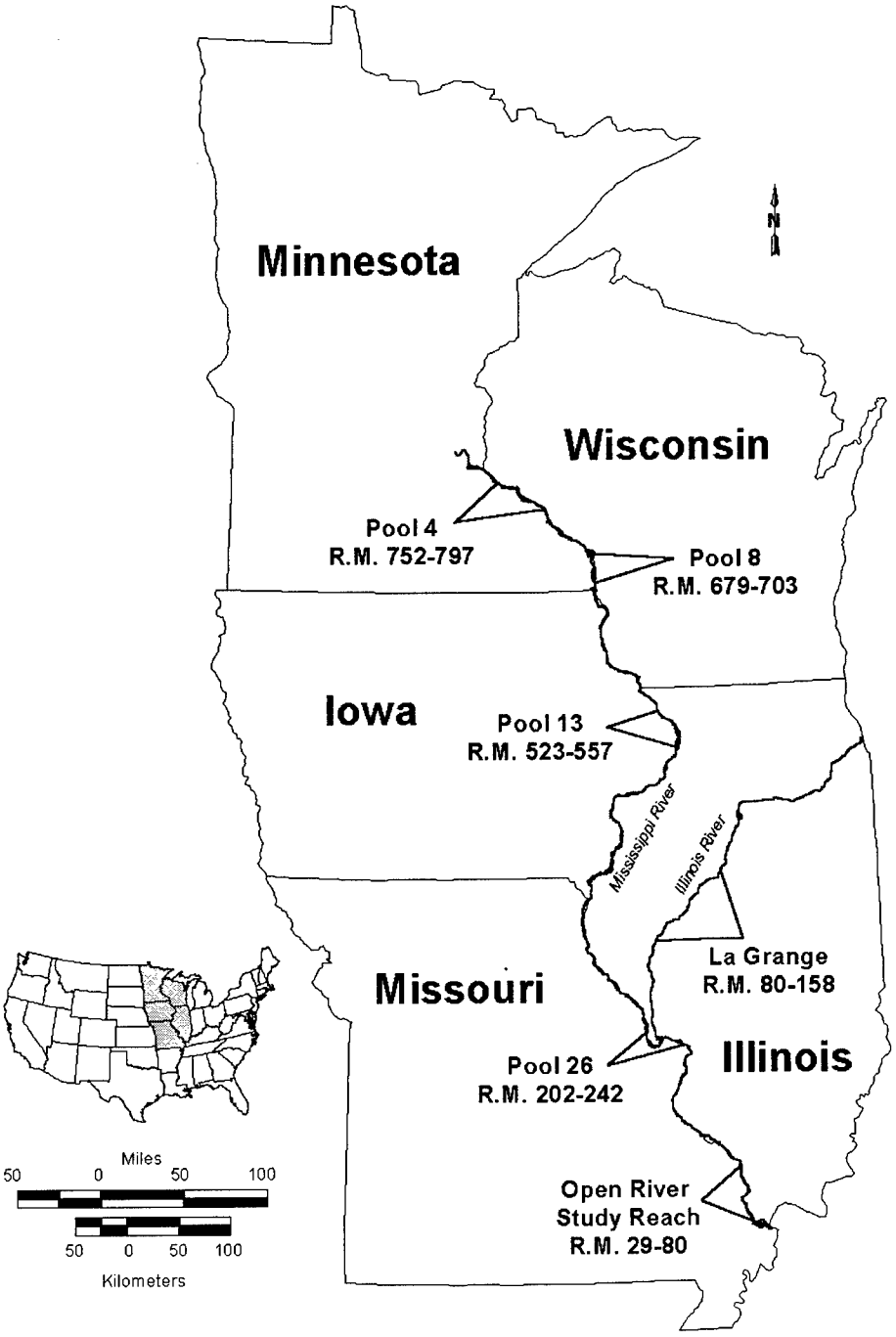

Figure. Long Term Resource Monitoring Program study reaches.

Table 1. Key features of the floodplain and aquatic area compositions of the Long Term Resource Monitoring Program's five Mississippi and Illinois River study reaches. Aquatic area is that portion of the floodplain that is inundated at normal water elevations. Main channel includes area in the navigation channel and main channel border areas. Data on floodplain composition are from Laustrup and Lowenberg (1994). Data on the composition of aquatic areas are from the Long Term Resource Monitoring Program aquatic areas spatial database.

		Floodplain composition (%)			Aquatic area composition (%)	
Study reach	Floodplain area (ha)	Open water	Aquatic vegetation	Agriculture	Contiguous backwater	Main channel
Pool 4	28,358	50.5	10.0	12.1	21.3	10.5
Pool 8	19,068	40.1	14.4	0.9	30.6	14.2
Pool 13	34,528	29.7	8.6	27.9	28.5	24.7
Pool 26	51,688	13.4	1.4	65.4	17.3	54.4
Open River	105,244	9.9	0.6	71.5	1.8	79.0
La Grange Pool, Illinois River	89,554	15.7	2.2	59.6	52.2	21.3

Methods

Sampling Methods

In this report, we summarize the annual increment of fish data obtained by the LTRMP from fixed-site sampling during 1992. The LTRMP fish monitoring design and sampling protocols, including historical changes, are given in Gutreuter et al. (1995). Readers requiring detailed descriptions should refer to that report. An abbreviated description of the LTRMP design and protocols follows; a list of common and scientific names of fish used in this report is found in Table 2.

Since 1990, the LTRMP has used day and night electrofishing, fyke nets, seines, small mini fyke nets, hoop nets, and small trawls to sample fish in various strata. The following is a summary of sampling gears according to Gutreuter et al. (1995):

Electrofishing

Electrofishing is conducted with pulsed direct current; boat configuration and power output are standardized (Burkhardt and Gutreuter 1995; Gutreuter et al. 1995). Electrofishing effort is of 15-min duration and is paced so that the boat covers a rectangle of about 200 × 30 m. Day and night electrofishing data from these two methods were combined for length–frequency analysis. The unit of effort is a 15-min run.

Table 2. Long Term Resource Monitoring Program list of fishes, arranged phylogenetically by family, then alphabetically by genus and species. Hybrids are listed after respective genera. Nomenclature follows Robins et al. (1991).

Common name	Family name	Scientific name
	Petromyzontidae	
Chestnut lamprey		*Ichthyomyzon castaneus*
Northern brook lamprey		*I. fossor*
Silver lamprey		*I. unicuspis*
Least brook lamprey		*Lampetra aepyptera*
American brook lamprey		*L. appendix*
Sea lamprey		*Petromyzon marinus*
	Carcharhinidae	
Bull shark		*Carcharhinus leucas*
	Acipenseridae	
Lake sturgeon		*Acipenser fulvescens*
Pallid sturgeon		*Scaphirhynchus albus*
Shovelnose sturgeon		*S. platorynchus*
	Polyodontidae	
Paddlefish		*Polyodon spathula*
	Lepisosteidae	
Spotted gar		*Lepisosteus oculatus*
Longnose gar		*L. osseus*
Shortnose gar		*L. platostomus*
Alligator gar		*L. spatula*
	Amiidae	
Bowfin		*Amia calva*
	Hiodontidae	
Goldeye		*Hiodon alosoides*
Mooneye		*H. tergisus*
	Anguillidae	
American eel		*Anguilla rostrata*
	Clupeidae	
Alabama shad		*Alosa alabamae*
Skipjack herring		*A. chrysochloris*
Alewife		*A. pseudoharengus*
Gizzard shad		*Dorosoma cepedianum*
Threadfin shad		*D. petenense*

Table 2. Continued.

Common name	Family name	Scientific name
	Cyprinidae	
Central stoneroller		*Campostoma anomalum*
Largescale stoneroller		*C. oligolepis*
Goldfish		*Carassius auratus*
Lake chub		*Couesius plumbeus*
Grass carp		*Ctenopharyngodon idella*
Red shiner		*Cyprinella lutrensis*
Spotfin shiner		*C. spiloptera*
Blacktail shiner		*C. venusta*
Steelcolor shiner		*C. whipplei*
Common carp		*Cyprinus carpio*
Goldfish × common carp		*Carassius auratus* × *C. carpio*
Gravel chub		*Erimystax x-punctatus*
Western silvery minnow		*Hybognathus argyritis*
Brassy minnow		*H. hankinsoni*
Mississippi silvery minnow		*H. nuchalis*
Plains minnow		*H. placitus*
Silver carp		*Hypopthalmichthys molitrix*
Bighead carp		*H. nobilis*
Striped shiner		*Luxilus chrysocephalus*
Common shiner		*L. cornutus*
Rosefin shiner		*Lythrurus ardens*
Ribbon shiner		*L. fumeus*
Redfin shiner		*L. umbratilis*
Speckled chub		*Macrhybopsis aestivalis*
Sturgeon chub		*M. gelida*
Sicklefin chub		*M. meeki*
Silver chub		*M. storeriana*
Pearl dace		*Margariscus margarita*
Hornyhead chub		*Nocomis biguttatus*
River chub		*N. micropogon*
Golden shiner		*Notemigonus crysoleucas*
Bigeye chub		*Notropis amblops*
Pallid shiner		*N. amnis*
Pugnose shiner		*N. anogenus*
Emerald shiner		*N. atherinoides*
River shiner		*N. blennius*
Bigeye shiner		*N. boops*
Silverjaw minnow		*N. buccatus*
Ghost shiner		*N. buchanani*
Ironcolor shiner		*N. chalybaeus*
Bigmouth shiner		*N. dorsalis*
Blackchin shiner		*N. heterodon*
Blacknose shiner		*N. heterolepis*
Bluehead shiner		*N. hubbsi*
Spottail shiner		*N. hudsonius*
Ozark minnow		*N. nubilus*
Rosyface shiner		*N. rubellus*
Silverband shiner		*N. shumardi*
Sand shiner		*N. stramineus*
Weed shiner		*N. texanus*
Mimic shiner		*N. volucellus*

Table 2. Continued.

Common name	Family name	Scientific name
Channel shiner		*N. wickliffi*
Pugnose minnow		*Opsopoeodus emiliae*
Suckermouth minnow		*Phenacobius mirabilis*
Northern redbelly dace		*Phoxinus eos*
Southern redbelly dace		*P. erythrogaster*
Bluntnose minnow		*Pimephales notatus*
Fathead minnow		*P. promelas*
Bullhead minnow		*P. vigilax*
Flathead chub		*Platygobio gracilis*
Blacknose dace		*Rhinichthys atratulus*
Longnose dace		*R. cataractae*
Creek chub		*Semotilus atromaculatus*
	Catostomidae	
River carpsucker		*Carpiodes carpio*
Quillback		*C. cyprinus*
Highfin carpsucker		*C. velifer*
Longnose sucker		*Catostomus catostomus*
White sucker		*C. commersoni*
Blue sucker		*Cycleptus elongatus*
Creek chubsucker		*Erimyzon oblongus*
Lake chubsucker		*E. sucetta*
Northern hog sucker		*Hypentelium nigricans*
Smallmouth buffalo		*Ictiobus bubalus*
Bigmouth buffalo		*I. cyprinellus*
Black buffalo		*I. niger*
Spotted sucker		*Minytrema melanops*
Silver redhorse		*Moxostoma anisurum*
River redhorse		*M. carinatum*
Black redhorse		*M. duquesnei*
Golden redhorse		*M. erythrurum*
Shorthead redhorse		*M. macrolepidotum*
Greater redhorse		*M. valenciennesi*
	Ictaluridae	
White catfish		*Ameiurus catus*
Black bullhead		*A. melas*
Yellow bullhead		*A. natalis*
Brown bullhead		*A. nebulosus*
Blue catfish		*Ictalurus furcatus*
Channel catfish		*I. punctatus*
Mountain madtom		*Noturus eleutherus*
Slender madtom		*N. exilis*
Stonecat		*N. flavus*
Tadpole madtom		*N. gyrinus*
Brindled madtom		*N. miurus*
Freckled madtom		*N. nocturnus*
Northern madtom		*N. stigmosus*
Flathead catfish		*Pylodictis olivaris*

Table 2. Continued.

Common name	Family name	Scientific name
	Esocidae	
Grass pickerel		*Esox americanus vermiculatus*
Northern pike		*E. lucius*
Muskellunge		*E. masquinongy*
Tiger muskellunge		*E. masquinongy* × *E. lucius*
Chain pickerel		*E. niger*
	Umbridae	
Central mudminnow		*Umbra limi*
	Osmeridae	
Rainbow smelt		*Osmerus mordax*
	Salmonidae	
Cisco		*Coregonus artedi*
Bloater		*C. hoyi*
Coho salmon		*Oncorhynchus kisutch*
Rainbow trout		*O. mykiss*
Brown trout		*Salmo trutta*
Brook trout		*Salvelinus fontinalis*
	Percopsidae	
Trout-perch		*Percopsis omiscomaycus*
	Aphredoderidae	
Pirate perch		*Aphredoderus sayanus*
	Amblyopsidae	
Spring cavefish		*Chologaster agassizi*
	Gadidae	
Burbot		*Lota lota*
	Cyprinodontidae	
Northern studfish		*Fundulus catenatus*
Banded killifish		*F. diaphanus*
Starhead topminnow		*F. dispar*
Blackstripe topminnow		*F. notatus*
Blackspotted topminnow		*F. olivaceus*
	Poeciliidae	
Western mosquitofish		*Gambusia affinis*

Table 2. Continued.

Common name	Family name	Scientific name
	Atherinidae	
Brook silverside		*Labidesthes sicculus*
Mississippi silverside		*Menidia audens*
Inland silverside		*M. beryllina*
	Gasterosteidae	
Brook stickleback		*Culaea inconstans*
Ninespine stickleback		*Pungitius pungitius*
	Cottidae	
Mottled sculpin		*Cottus bairdi*
Banded sculpin		*C. carolinae*
Slimy sculpin		*C. cognatus*
Deepwater sculpin		*Myoxocephalus thompsoni*
	Percichthyidae	
White perch		*Morone americana*
White bass		*M. chrysops*
Yellow bass		*M. mississippiensis*
Striped bass		*M. saxatilis*
White bass × striped bass		*M. chrysops* × *M. saxatilis*
	Centrarchidae	
Shadow bass		*Ambloplites ariommus*
Rock bass		*A. rupestris*
Flier		*Centrarchus macropterus*
Banded pygmy sunfish		*Elassoma zonatum*
Green sunfish		*Lepomis cyanellus*
Pumpkinseed		*L. gibbosus*
Warmouth		*L. gulosus*
Orangespotted sunfish		*L. humilis*
Bluegill		*L. macrochirus*
Longear sunfish		*L. megalotis*
Redear sunfish		*L. microlophus*
Spotted sunfish		*L. punctatus*
Bantam sunfish		*L. symmetricus*
Green sunfish × pumpkinseed		*L. cyanellus* × *L. gibbosus*
Green sunfish × warmouth		*L. cyanellus* × *L. gulosus*
Green sunfish × orangespotted sunfish		*L. cyanellus* × *L. humilis*
Green sunfish × bluegill		*L. cyanellus* × *L. macrochirus*
Green sunfish × redear sunfish		*L. cyanellus* × *L. microlophus*
Green sunfish × unknown		*L. cyanellus* × sp.
Pumpkinseed × warmouth		*L. gibbosus* × *L. gulosus*
Pumpkinseed × orangespotted sunfish		*L. gibbosus* × *L. humilis*
Pumpkinseed × bluegill		*L. gibbosus* × *L. macrochirus*
Orangespotted sunfish × longear sunfish		*L. humilis* × *L. megalotis*
Bluegill × warmouth		*L. macrochirus* × *L. gulosus*
Bluegill × orangespotted sunfish		*L. macrochirus* × *L. humilis*

Table 2. Continued.

Common name	Family name	Scientific name
Bluegill × longear sunfish		*L. macrochirus* × *L. megalotis*
Bluegill × redear sunfish		*L. macrochirus* × *L. microlophus*
Redear sunfish × warmouth		*L. microlophus* × *L. gulosus*
Smallmouth bass		*Micropterus dolomieu*
Spotted bass		*M. punctulatus*
Largemouth bass		*M. salmoides*
White crappie		*Pomoxis annularis*
Black crappie		*P. nigromaculatus*
White crappie × black crappie		*P. annularis* × *P. nigromaculatus*
	Percidae	
Crystal darter		*Ammocrypta asprella*
Western sand darter		*A. clara*
Eastern sand darter		*A. pellucida*
Mud darter		*Etheostoma asprigene*
Greenside darter		*E. blennioides*
Rainbow darter		*E. caeruleum*
Bluebreast darter		*E. camurum*
Bluntnose darter		*E. chlorosomum*
Iowa darter		*E. exile*
Fantail darter		*E. flabellare*
Slough darter		*E. gracile*
Harlequin darter		*E. histrio*
Stripetail darter		*E. kennicotti*
Least darter		*E. microperca*
Johnny darter		*E. nigrum*
Cypress darter		*E. proelaire*
Orangethroat darter		*E. spectabile*
Spottail darter		*E. squamiceps*
Banded darter		*E. zonale*
Yellow perch		*Perca flavescens*
Logperch		*Percina caprodes*
Blackside darter		*P. maculata*
Slenderhead darter		*P. phoxocephala*
Dusky darter		*P. sciera*
River darter		*P. shumardi*
Sauger		*Stizostedion canadense*
Walleye		*S. vitreum*
Sauger × walleye		*S. canadense* × *S. vitreum*
	Sciaenidae	
Freshwater drum		*Aplodinotus grunniens*
	Mugilidae	
Striped mullet		*Mugil cephalus*

Tandem Hoop Netting

The LTRMP uses two sizes of hoop nets. The large nets are composed of seven fiberglass hoops with diameters of 1.1 to 1.2 m. These nets are 4.8 m long, contain two finger-style throats, and are constructed of 3.7-cm (bar measure) nylon mesh. The small nets are composed of seven fiberglass hoops with diameters of 0.5 to 0.6 m. The small nets are 3 m long, contain two finger-style throats, and are constructed of 1.8-cm (bar measure) nylon mesh. Large and small hoop nets are deployed tandemly within sampling sites. Both nets are baited with 3 kg of soybean cake. For this report, the estimates from pairs of nets are pooled and therefore treated as a single gear. The unit of effort is a net-day, which is 24 h of effort by a pair of nets.

Seining

The LTRMP uses 10.7-m-long seines constructed of 3-mm Ace-type nylon mesh. These seines are 1.8 m high and have a 0.9-m^2 bag in the centers. Seines are extended perpendicularly to shorelines and then swept in a 90° arc downstream to the shoreline. The unit of effort is a haul.

Fyke Netting

The LTRMP uses Wisconsin-type fyke nets (trap nets) that contain three sections: the lead, frame, and cab. All netting is 1.8-cm (bar measure) mesh. Leads are 15 m long and 1.3 m high. The spring steel frames are 0.9 m high and 1.8 m wide with two internal wing throats. The cabs are constructed of six steel hoops (0.9 m in diameter) containing two throats. These nets are fished singly from shoreline or from beds of dense vegetation or in tandem (with leads connected) offshore. The unit of effort is a net-day, where each frame is one net. Fyke net and tandem fyke net data were combined for length–frequency distribution analysis.

Mini Fyke Netting

Mini fyke nets are small, Wisconsin-type fyke nets. Mesh size is 3-mm Ace-type nylon. The leads are 4.5 m long and 0.6 m high. The spring steel frames are 0.6 m high and 1.2 m wide with two internal wing throats. The cabs are constructed of two steel hoops (0.6 m in diameter) with one throat. These nets are fished singly from shoreline or from beds of dense vegetation or in tandem (with leads connected) offshore. The unit of effort is a net-day, where each frame is one net.

Trawling

Trawling is conducted only at permanently fixed sampling sites in tailwater zones and unstructured channel borders. The LTRMP trawls collect mainly small, bottom-dwelling fish. The trawls are two-seam, 4.8-m slingshot balloon trawls (TRL16BC, Memphis Net and Twine Co., Inc., or the equivalent). The body of the trawl is made of No. 9 nylon with stretch mesh 18 mm in diameter. The cod end is made of No. 18 nylon with stretch mesh 18 mm in diameter. The cod end contains a 1.8-m liner consisting of 3-mm Ace-type nylon mesh. Floats are spaced every 0.91 m along the headrope, and a 4.8-mm steel chain is tied to the footrope. The trawl is equipped with 37-cm-high by 75-cm-long iron "V" doors (otter boards). These trawls are dragged downriver by small, flat-bottomed boats. Trawl speed is barely faster than ambient current speed. The standard unit of trawl effort is a haul. A minimum of six hauls is collected in main or side channel sites and four hauls at tailwater sites.

Statistical Methods

The LTRMP uses mean catch-per-unit-effort (*C/f*) as an index of abundance, as is conventional practice (Ricker 1975). The units of effort are specific to particular gears. For electrofishing and seining, effort is a constant, but for other gears it is somewhat variable. For example, although the effort goal for fyke nets is 1 day (Gutreuter et al. 1995), actual effort may vary between 20 and 30 h. Catch and effort are recorded for each species from individual samples (deployments of particular gears) at unique combinations of time and place. Whenever a species is not caught in a sample, the catch for that species in that sample is zero. Although these zero catches are not recorded, they are reconstructed for analyses.

For an arbitrary random variable denoted y (for this report y represents *C/f*), the pooled mean, denoted $\bar{y}_{st}$ (*st* represents stratified) is given by

$$\bar{y}_{st} = \frac{1}{N}\sum_{h=1}^{L} N_h \bar{y}_h \tag{1}$$

where N_h is the number of sampling units within stratum h, $N = \Sigma_{h=1}^{L} N_h$, and $\bar{y}_h$ denotes the estimator of the simple mean of y for stratum h. The estimator of the variance of $\bar{y}_{st}$ is

$$s^2(\bar{y}_{st}) = \frac{1}{N^2}\sum_{h=1}^{L} N_h(N_h - n_h)\left(\frac{s_h^2}{n_h}\right) \tag{2}$$

where

$$s_h^2 = \frac{\sum_{i=1}^{n_h} (y_{hi} - \bar{y}_h)^2}{n_h - 1}$$

is the usual estimator of the variance of y_h and n_h is the number of samples taken in stratum h (Cochran 1977). The standard error of $\bar{y}_{st}$ is therefore $s(\bar{y}_{st})$.

In this report, *C/f* statistics are reported for the fixed-site sampling. Equation (1) is used to estimate means of data obtained from fixed-site sampling to maintain computational consistency. The pooled means from fixed-site sampling are not guaranteed unbiased because there is no assurance that the fixed sites were unbiased within the stratum.

Length distribution analysis was performed for 13 selected fish species (gear used): gizzard shad (electrofishing), common carp (electrofishing), smallmouth buffalo (electrofishing; tandem large and small hoop netting), channel catfish (electrofishing; tandem large and small hoop netting), northern pike (electrofishing; fyke and tandem fyke netting), white bass (electrofishing), bluegill (electrofishing; fyke and tandem fyke netting), largemouth bass (electrofishing), white crappie (electrofishing; fyke and tandem fyke netting), black crappie (electrofishing; fyke and tandem fyke netting), sauger (electrofishing), walleye (electrofishing), and freshwater drum (electrofishing; fyke and tandem fyke netting). The data are illustrated in the form of histograms within the following chapters. In some instances, meaningful biological interpretation of these distributions may be limited by small sample size or size selectivity of the gear (Anderson and Neumann 1996). Some fish histograms with small sample sizes (<100) are included in this report because of local interest, while others were omitted (reach dependent).

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Chapter 1. Pool 4, Upper Mississippi River

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Hydrograph

Water levels were below the 30-year average during the beginning of the first period but rose above the average near the middle of the period (Figure 1.1). Water levels during the second and third periods were close to the 30-year average. The sampling season was characterized by cool temperatures throughout summer.

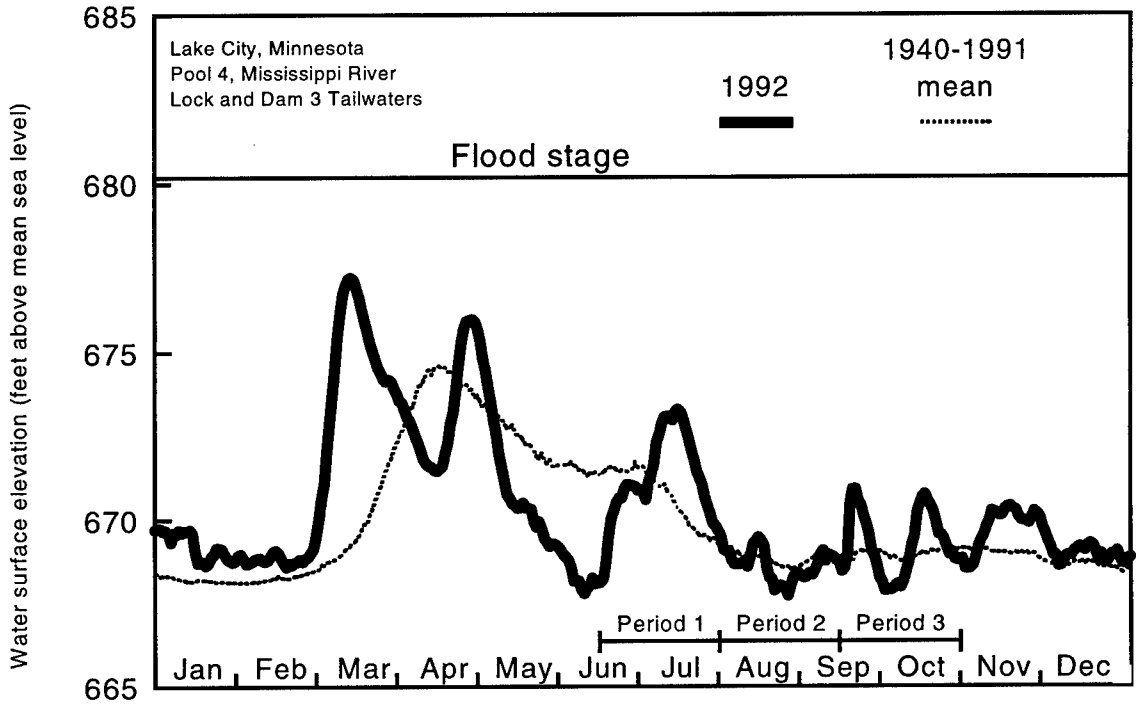

Figure 1.1. Daily water surface elevation from Lock and Dam 3 for Pool 4, Upper Mississippi River, during 1992 and mean elevation since 1940. The U.S. Army Corps of Engineers discharge data were obtained from the Environmental Management Technical Center (Wlosinski et al. 1995).

Summary of Sampling Effort

Our target effort allocation for 1992 consisted of 348 collections at fixed sites (Table 1.1), divided equally among three periods. All 116 allocated collections were completed during each of the three sampling periods.

Total Catch by Gear

In 1992, 65 species were represented among the 33,953 fish we collected (Table 1.2). The most abundant species were the emerald shiner (66% of the total catch), gizzard shad (8%), freshwater drum (3%), white bass (3%), and common carp (3%). Total catches by gear were day electrofishing, 3,010; night electrofishing,

5,459; fyke net, 774; tandem fyke net, 868; mini fyke, 17,135; tandem mini fyke, 228; seine, 5,470; hoop net, 938; and trawl, 75.

Fixed Sampling, Mean *C/f* by Gear and Stratum

Day Electrofishing

We collected 49 species in 48 day electrofishing collections (Table 1.2). The gizzard shad had the highest mean *C/f* (Table 1.3.1) in the BWCO (176/h = 4 × 43.94/15-min run). The shorthead redhorse had the highest *C/f* (64/h) in the MCBW and the emerald shiner had the highest *C/f* in the BWCS (90/h).

Night Electrofishing

We collected 42 species and one hybrid by night electrofishing (Table 1.3.2). The emerald shiner had the highest mean *C/f*s (Table 1.3.2) in the MCBU (224/h) and the SCB (116/h). The freshwater drum (161/h) had the highest *C/f* in the TWZ, and the gizzard shad had the highest *C/f* in the BWCO (140/h). Five species were collected exclusively by electrofishing (day and night combined) including the highfin carpsucker, brown trout, burbot, pumpkinseed, and slenderhead darter (Table 1.2).

Fyke Net

We collected 26 species in fyke nets (Table 1.2). The freshwater drum had the highest *C/f*s in the TWZ (15/net-day) and the BWCS (11/net-day) strata (Table 1.3.3).

Tandem Fyke Net

We collected 26 species in tandem fyke nets (Table 1.2) in the BWCO. The highest *C/f*s (Table 1.3.4) were for the freshwater drum (12/net-day) and black crappie (4/net-day).

Mini Fyke Net

We collected 37 species in mini fyke nets (Table 1.2). The emerald shiner had the highest *C/f* (Table 1.3.5) in the TWZ (2,640/net-day), BWCS (37/net-day), and MCBW (17/net-day) strata.

Tandem Mini Fyke Net

We collected 26 species in tandem mini fyke nets (Table 1.2). The highest *C/f*s (Table 1.3.6) were for the spottail shiner (2/net-day) and the freshwater drum and bullhead minnow (1 each/net-day).

Seine

We collected 32 species in the seine (Table 1.2). The emerald shiner had the highest *C/f*s (Table 1.3.7) in the MCBU (74/haul) and SCB (107/haul) strata. Two species, the sand shiner and blacknose dace, were collected exclusively by seining during 1992.

Tandem Hoop Net

We collected 18 species in tandem hoop nets (Table 1.2). The common carp had the highest *C/f*s (Table 1.3.8) in the MCBW (3/net-day) and TWZ (16/net-day) strata. The channel catfish had the highest *C/f*s in the MCBU and SCBU (5/net-day per strata).

Trawl

We collected 19 species in the trawl (Table 1.2). The highest *C/f* among all strata (Table 1.3.9) was for the freshwater drum (0.05/haul). The shovelnose sturgeon was collected solely in the trawl during 1992.

Length Distributions of Selected Species

Gizzard Shad

The modal length of 2,199 gizzard shad collected by electrofishing was 2 cm (Figure 1.2). Lengths of gizzard shad caught by electrofishing ranged from 2 to 40 cm.

Common Carp

The modal length of 399 common carp collected by electrofishing was 48 cm (Figure 1.3). Common carp ranged in length from 4 to 76 cm.

Channel Catfish

The modal length of 258 channel catfish collected in hoop nets was 40 cm (Figure 1.4). Lengths of channel catfish from hoop nets ranged from 18 to 68 cm.

White Bass

The length distribution of 800 white bass collected by electrofishing is presented in Figure 1.5. Lengths ranged from 4 to 40 cm, and the modal length was 10 cm.

Bluegill

The modal length of 188 bluegills collected by electrofishing was 8 cm, and the maximum length was 20 cm (Figure 1.6). The 113 bluegills collected in fyke nets ranged in length from 8 to 20 cm, and the modal length was 16 cm (Figure 1.7).

Largemouth Bass

The length distribution of 119 largemouth bass collected by electrofishing is presented in Figure 1.8. Lengths ranged from 2 to 40 cm, and the modal length was 8 cm.

Black Crappie

The lengths of 192 black crappies collected in fyke nets ranged from 6 to 30 cm (Figure 1.9). The modal length was 20 cm.

Sauger

The length distribution of 387 saugers collected by electrofishing is presented in Figure 1.10. Lengths of saugers ranged from 4 to 44 cm, and the modal length was 14 cm.

Walleye

The length distribution of 215 walleyes collected by electrofishing is presented in Figure 1.11. Individuals ranged from 6 to 66 cm in length, and the modal length was 14 cm.

Freshwater Drum

Freshwater drum collected by electrofishing ranged from 6 to 46 cm in length, and the modal length was 24 cm (Figure 1.12). Freshwater drum collected in fyke nets were from 10 to 42 cm in length, and the modal length was 30 cm (Figure 1.13).

Table 1.1. Allocation of fish sampling effort among strata by the Long Term Resource Monitoring Program in Pool 4 of the Mississippi River during 1992. Table entries are numbers of successfully completed standardized monitoring collections.

Sampling period = 1: June 15 - July 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	CTR	TWZ	TOTAL
Day electrofishing	7	5			4					16
Fyke net	6								2	8
Tandem hoop net			4	4	4				2	14
Mini fyke net	6				4				2	12
Night electrofishing		4	4	4					2	14
Seine			8	8						16
Trawling				8				12	4	24
Tandem fyke net	1	5								6
Tandem mini fyke net	1	5								6
SUBTOTAL	21	19	16	24	12	0	0	12	12	116

Sampling period = 2: August 1 - September 14

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	CTR	TWZ	TOTAL
Day electrofishing	7	5			4					16
Fyke net	6								2	8
Tandem hoop net			4	4	4				2	14
Mini fyke net	6				4				2	12
Night electrofishing		4	4	4					2	14
Seine			8	8						16
Trawling				8				12	4	24
Tandem fyke net	1	5								6
Tandem mini fyke net	1	5								6
SUBTOTAL	21	19	16	24	12	0	0	12	12	116

Sampling period = 3: September 15 - October 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	CTR	TWZ	TOTAL
Day electrofishing	7	5			4					16
Fyke net	6								2	8
Tandem hoop net			4	4	4				2	14
Mini fyke net	6				4				2	12
Night electrofishing		4	4	4					2	14
Seine			8	8						16
Trawling				8				12	4	24
Tandem fyke net	1	5								6
Tandem mini fyke net	1	5								6
SUBTOTAL	21	19	16	24	12	0	0	12	12	116
	63	57	48	72	36	0	0	36	36	348

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
CTR - Main channel trough.
TWZ - Tailwater.

Table 1.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1992 in Pool 4 of the Mississippi River. See Table 1.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	H	T	TOTAL
1	Chestnut lamprey	Ichthyomyzon castaneus	-	1	-	1	-	-	-	1	-	3
2	Silver lamprey	Ichthyomyzon unicuspis	-	-	-	1	-	-	-	-	-	1
3	Shovelnose sturgeon	Scaphirhynchus platorynchus	-	-	-	-	-	-	-	-	1	1
4	Longnose gar	Lepisosteus osseus	1	4	4	-	2	-	-	-	-	11
5	Shortnose gar	Lepisosteus platostomus	1	8	4	-	-	-	-	2	-	15
6	Bowfin	Amia calva	3	-	15	1	4	-	-	-	-	23
7	Mooneye	Hiodon tergisus	11	5	-	8	-	-	-	-	-	24
8	Gizzard shad	Dorosoma cepedianum	1070	1129	4	14	354	3	69	-	-	2643
9	Spotfin shiner	Cyprinella spiloptera	18	30	-	-	41	-	132	-	-	221
10	Common carp	Cyprinus carpio	113	286	122	60	3	3	2	401	3	993
11	Speckled chub	Macrhybopsis aestivalis	-	-	-	-	4	-	-	-	3	7
12	Silver chub	Macrhybopsis storeriana	4	89	-	1	9	4	4	2	7	120
13	Golden shiner	Notemigonus crysoleucas	45	-	-	4	2	-	-	-	-	51
14	Emerald shiner	Notropis atherinoides	666	1157	-	-	16288	23	4361	-	-	22495
15	River shiner	Notropis blennius	-	116	-	-	-	-	88	-	1	205
16	Spottail shiner	Notropis hudsonius	28	14	-	-	9	57	20	-	-	128
17	Sand shiner	Notropis stramineus	-	-	-	-	-	-	1	-	-	1
18	Weed shiner	Notropis texanus	-	-	-	-	-	1	-	-	-	1
19	Mimic shiner	Notropis volucellus	1	71	-	-	17	-	220	-	2	311
20	Pugnose minnow	Opsopoeodus emiliae	14	-	-	-	213	3	4	-	-	234
21	Fathead minnow	Pimephales promelas	-	-	-	-	1	-	1	-	-	2
22	Bullhead minnow	Pimephales vigilax	21	36	-	-	20	38	126	-	-	241
23	Blacknose dace	Rhinichthys atratulus	-	-	-	-	-	-	1	-	-	1
24	Unidentified minnow	Cyprinidae sp.	-	-	-	-	-	-	4	-	-	4
25	River carpsucker	Carpiodes carpio	1	6	3	1	-	-	-	1	-	12
26	Quillback	Carpiodes cyprinus	10	93	1	3	2	1	87	-	-	197
27	Highfin carpsucker	Carpiodes velifer	1	-	-	-	-	-	-	-	-	1
28	White sucker	Catostomus commersoni	11	8	10	1	1	-	13	1	-	45
29	Blue sucker	Cycleptus elongatus	1	-	-	-	-	-	-	-	1	2
30	Northern hog sucker	Hypentelium nigricans	3	-	-	-	-	-	-	1	-	4
31	Smallmouth buffalo	Ictiobus bubalus	10	14	10	-	1	-	-	20	-	55
32	Bigmouth buffalo	Ictiobus cyprinellus	2	4	1	-	1	-	-	1	-	9
33	Spotted sucker	Minytrema melanops	36	3	1	1	-	-	-	-	-	41
34	Silver redhorse	Moxostoma anisurum	69	55	58	47	4	4	1	5	-	243
35	River redhorse	Moxostoma carinatum	16	-	1	-	-	-	-	-	-	17
36	Golden redhorse	Moxostoma erythrurum	2	63	1	1	-	-	-	-	-	67
37	Shorthead redhorse	Moxostoma macrolepidotum	247	275	11	6	-	3	17	48	3	610
38	Black bullhead	Ameiurus melas	-	-	-	-	-	1	-	-	-	1
39	Yellow bullhead	Ameiurus natalis	-	-	-	1	-	-	-	-	-	1
40	Channel catfish	Ictalurus punctatus	17	12	3	2	1	-	-	258	13	306

Gears: D - Day electrofishing
N - Night electrofishing
F - Fyke netting
M - Mini fyke netting
T - Trawling (4.8-m bottom trawl)
S - Seining
H - Tandem hoop netting
X - Tandem fyke netting
Y - Tandem min fyke netting

Table 1.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1992 in Pool 4 of the Mississippi River. See Table 1.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	H	T	TOTAL
41	Tadpole madtom	Noturus gyrinus	1	-	-	-	1	1	1	-	-	4
42	Flathead catfish	Pylodictis olivaris	1	9	-	-	1	-	-	9	2	22
43	Northern pike	Esox lucius	5	6	7	3	-	-	-	1	-	22
44	Brown trout	Salmo trutta	-	1	-	-	-	-	-	-	-	1
45	Trout-perch	Percopsis omiscomaycus	-	-	-	-	-	4	-	-	1	5
46	Burbot	Lota lota	1	2	-	-	-	-	-	-	-	3
47	Brook silverside	Labidesthes sicculus	1	-	-	-	1	-	4	-	-	6
48	White bass	Morone chrysops	69	731	84	67	55	7	37	16	17	1083
49	Rock bass	Ambloplites rupestris	11	84	12	5	6	2	3	13	-	136
50	Green sunfish	Lepomis cyanellus	-	9	-	-	4	-	1	-	-	14
51	Pumpkinseed	Lepomis gibbosus	3	-	-	-	-	-	-	-	-	3
52	Bluegill	Lepomis macrochirus	60	128	70	43	44	4	6	41	2	398
53	Green sunfish x pumpkinseed	L. cyanellus x L. gibbosus	-	-	-	-	1	-	-	-	-	1
54	Pumpkinseed x bluegill	L. gibbosus x L. macrochirus	-	1	-	-	-	-	-	-	-	1
55	Smallmouth bass	Micropterus dolomieu	63	92	-	-	-	-	9	-	2	166
56	Largemouth bass	Micropterus salmoides	90	29	2	-	4	1	9	-	-	135
57	White crappie	Pomoxis annularis	1	8	9	1	4	3	-	3	-	29
58	Black crappie	Pomoxis nigromaculatus	18	27	54	138	9	9	-	59	-	314
59	Western sand darter	Ammocrypta clara	-	1	-	-	-	-	8	-	1	10
60	Mud darter	Etheostoma asprigene	-	-	-	-	2	5	-	-	-	7
61	Johnny darter	Etheostoma nigrum	9	1	-	-	7	4	64	-	-	85
62	Yellow perch	Perca flavescens	82	15	1	22	2	3	4	-	1	130
63	Logperch	Percina caprodes	34	17	-	-	3	-	55	-	-	109
64	Slenderhead darter	Percina phoxocephala	3	-	-	-	-	-	-	-	-	3
65	River darter	Percina shumardi	3	-	-	-	2	-	113	-	-	118
66	Sauger	Stizostedion canadense	36	351	2	3	2	1	4	5	2	406
67	Walleye	Stizostedion vitreum	53	162	2	3	1	2	1	1	4	229
68	Sauger x walleye	S. canadense x S. vitreum	1	-	-	-	-	-	-	-	-	1
69	Freshwater drum	Aplodinotus grunniens	43	306	282	430	9	41	-	49	9	1169
			3010	5459	774	868	17135	228	5470	938	75	33957

Gears: D - Day electrofishing
N - Night electrofishing
F - Fyke netting
M - Mini fyke netting
T - Trawling (4.8-m bottom trawl)
S - Seining
H - Tandem hoop netting
X - Tandem fyke netting
Y - Tandem min fyke netting

Table 1.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by day electrofishing in Pool 4 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Longnose gar	0.08 (0.08)									
Shortnose gar						0.08 (0.08)				
Bowfin		0.17 (0.12)								
Mooneye	0.06 (0.06)					0.70 (0.44)				
Gizzard shad	43.94 (33.64)	16.33 (7.52)				6.55 (5.70)				
Spotfin shiner		0.78 (0.42)				0.23 (0.16)				
Common carp	0.41 (0.23)	5.11 (1.21)				1.03 (0.48)				
Silver chub						0.33 (0.33)				
Golden shiner	0.72 (0.51)	1.78 (1.39)								
Emerald shiner	5.40 (1.72)	22.61 (11.80)				15.75 (7.32)				
Spottail shiner	0.39 (0.39)	1.06 (0.29)				0.08 (0.08)				
Mimic shiner						0.09 (0.09)				
Pugnose minnow	0.11 (0.11)	0.67 (0.31)								
Bullhead minnow		0.61 (0.28)				0.76 (0.45)				
River carpsucker		0.06 (0.06)								
Quillback	0.08 (0.08)	0.33 (0.23)				0.30 (0.22)				
Highfin carpsucker						0.10 (0.10)				
White sucker	0.17 (0.09)	0.06 (0.06)				0.26 (0.22)				
Blue sucker						0.04 (0.04)				
Northern hog sucker						0.19 (0.12)				
Smallmouth buffalo		0.44 (0.25)				0.19 (0.13)				
Bigmouth buffalo		0.06 (0.06)				0.10 (0.10)				
Spotted sucker	0.22 (0.17)	1.78 (0.71)								
Silver redhorse	0.56 (0.17)	0.50 (0.35)				3.17 (1.48)				
River redhorse						1.06 (0.38)				
Golden redhorse	0.06 (0.06)	0.06 (0.06)								
Shorthead redhorse		1.00 (0.60)				16.09 (3.95)				
Channel catfish		0.22 (0.17)				0.79 (0.32)				
Tadpole madtom						0.04 (0.04)				
Flathead catfish						0.07 (0.07)				

Strata: BWCS - Backwater, contiguous, shoreline
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IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 1.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by day electrofishing in Pool 4 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Northern pike		0.22				0.07				
		(0.13)				(0.07)				
Burbot						0.09				
						(0.09)				
Brook silverside		0.06								
		(0.06)								
White bass	0.41	1.50				2.65				
	(0.29)	(0.83)				(0.91)				
Rock bass		0.50				0.07				
		(0.15)				(0.07)				
Pumpkinseed		0.17								
		(0.09)								
Bluegill		2.56				1.03				
		(0.81)				(0.56)				
Smallmouth bass		0.33				2.73				
		(0.20)				(1.16)				
Largemouth bass	0.33	3.78				0.94				
	(0.24)	(1.13)				(0.58)				
White crappie		0.06								
		(0.06)								
Black crappie	0.30	0.67				0.08				
	(0.23)	(0.24)				(0.08)				
Johnny darter		0.39				0.08				
		(0.18)				(0.05)				
Yellow perch	0.39	3.89				0.19				
	(0.24)	(1.11)				(0.13)				
Logperch		0.22				1.83				
		(0.17)				(0.74)				
Slenderhead darter						0.13				
						(0.13)				
River darter						0.17				
						(0.10)				
Sauger	0.06	1.67				0.38				
	(0.06)	(0.38)				(0.33)				
Walleye	0.22	1.78				1.45				
	(0.13)	(0.66)				(0.34)				
Sauger x walleye						0.04				
						(0.04)				
Freshwater drum	1.02	0.39				1.49				
	(0.39)	(0.16)				(0.82)				

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MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 1.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by night electrofishing in Pool 4 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Chestnut lamprey					0.08					
					(0.08)					
Longnose gar										0.67
										(0.67)
Shortnose gar	0.08				0.08		0.08			0.83
	(0.08)				(0.08)		(0.08)			(0.48)
Mooneye	0.08				0.25		0.08			
	(0.08)				(0.18)		(0.08)			
Gizzard shad	35.08				30.67		26.75			3.17
	(19.92)				(9.87)		(10.48)			(2.20)
Spotfin shiner					1.00		1.25			0.50
					(0.51)		(0.66)			(0.50)
Common carp	0.25				8.67		7.17			15.50
	(0.13)				(2.80)		(1.42)			(5.37)
Silver chub	0.50				3.25		3.58			0.17
	(0.29)				(1.12)		(1.87)			(0.17)
Emerald shiner	7.08				56.08		28.92			8.67
	(4.21)				(19.15)		(7.70)			(4.27)
River shiner					4.08		5.50			0.17
					(2.24)		(5.05)			(0.17)
Spottail shiner	0.58						0.50			0.17
	(0.58)						(0.15)			(0.17)
Mimic shiner					3.83		1.58			1.00
					(2.04)		(0.82)			(0.45)
Bullhead minnow	0.08				0.33		2.50			0.17
	(0.08)				(0.19)		(0.86)			(0.17)
River carpsucker							0.17			0.67
							(0.11)			(0.33)
Quillback	0.08				1.08		6.42			0.33
	(0.08)				(0.45)		(4.96)			(0.33)
White sucker							0.58			0.17
							(0.42)			(0.17)
Smallmouth buffalo	0.25				0.17		0.67			0.17
	(0.25)				(0.11)		(0.43)			(0.17)
Bigmouth buffalo					0.25					0.17
					(0.13)					(0.17)
Spotted sucker	0.17						0.08			
	(0.11)						(0.08)			
Silver redhorse	0.92				1.67		1.75			0.50
	(0.58)				(0.43)		(0.80)			(0.50)
Golden redhorse					0.33		1.00			7.83
					(0.19)		(0.49)			(5.42)
Shorthead redhorse	0.25				12.00		7.33			6.67
	(0.25)				(3.10)		(2.76)			(3.20)
Channel catfish	0.08				0.42		0.25			0.50
	(0.08)				(0.19)		(0.18)			(0.34)
Flathead catfish					0.25		0.17			0.67
					(0.18)		(0.11)			(0.42)
Northern pike					0.17		0.17			0.33
					(0.11)		(0.17)			(0.21)
Brown trout					0.08					
					(0.08)					
Burbot										0.33
										(0.33)
White bass	0.83				19.83		23.25			34.00
	(0.58)				(7.73)		(9.55)			(15.45)
Rock bass	0.08				4.00		2.92			
	(0.08)				(1.81)		(1.14)			
Green sunfish							0.08			1.33
							(0.08)			(0.56)

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SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 1.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by night electrofishing in Pool 4 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Bluegill					1.17		4.92			9.17
					(0.73)		(1.77)			(4.71)
Pumpkinseed x bluegill										0.17
										(0.17)
Smallmouth bass					1.33		1.50			9.67
					(0.57)		(0.71)			(1.20)
Largemouth bass	0.08				0.67		1.58			0.17
	(0.08)				(0.58)		(0.54)			(0.17)
White crappie							0.08			1.17
							(0.08)			(0.60)
Black crappie					0.42		0.50			2.67
					(0.23)		(0.26)			(1.78)
Western sand darter					0.08					
					(0.08)					
Johnny darter							0.08			
							(0.08)			
Yellow perch	0.33				0.08		0.83			
	(0.33)				(0.08)		(0.37)			
Logperch	0.08				0.17		0.50			1.33
	(0.08)				(0.11)		(0.15)			(0.80)
Sauger	0.42				6.67		10.50			23.33
	(0.34)				(1.47)		(3.22)			(13.51)
Walleye	0.75				3.00		4.25			11.00
	(0.51)				(1.04)		(1.40)			(6.36)
Freshwater drum	2.50				1.67		1.17			40.33
	(0.82)				(1.06)		(0.44)			(7.34)

Strata: BWCS - Backwater, contiguous, shoreline
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IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 1.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by fyke netting in Pool 4 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Longnose gar		0.21								
		(0.21)								
Shortnose gar		0.23								
		(0.23)								
Bowfin		0.80								0.19
		(0.31)								(0.19)
Gizzard shad		0.16								0.17
		(0.09)								(0.17)
Common carp		6.35								1.06
		(1.38)								(0.54)
River carpsucker		0.05								0.34
		(0.05)								(0.34)
Quillback		0.05								
		(0.05)								
White sucker		0.56								
		(0.26)								
Smallmouth buffalo		0.55								
		(0.29)								
Bigmouth buffalo		0.05								
		(0.05)								
Spotted sucker		0.06								
		(0.06)								
Silver redhorse		3.33								
		(0.83)								
River redhorse		0.06								
		(0.06)								
Golden redhorse										0.17
										(0.17)
Shorthead redhorse		0.54								0.17
		(0.24)								(0.17)
Channel catfish		0.16								
		(0.12)								
Northern pike		0.22								0.55
		(0.13)								(0.38)
White bass		3.39								3.70
		(1.39)								(1.60)
Rock bass		0.70								
		(0.23)								
Bluegill		3.74								1.60
		(2.37)								(1.14)
Largemouth bass		0.11								
		(0.08)								
White crappie		0.21								0.84
		(0.14)								(0.55)
Black crappie		2.23								2.37
		(0.65)								(1.17)
Yellow perch		0.06								
		(0.06)								
Sauger		0.10								
		(0.07)								
Walleye		0.11								
		(0.07)								
Freshwater drum		10.50								14.80
		(9.52)								(9.71)

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SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 1.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by tandem fyke netting in Pool 4 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Chestnut lamprey	0.03									
	(0.03)									
Silver lamprey	0.03									
	(0.03)									
Bowfin	0.03									
	(0.03)									
Mooneye	0.22									
	(0.11)									
Gizzard shad	0.39									
	(0.17)									
Common carp	1.69									
	(0.47)									
Silver chub	0.03									
	(0.03)									
Golden shiner	0.11									
	(0.07)									
River carpsucker	0.03									
	(0.03)									
Quillback	0.09									
	(0.06)									
White sucker	0.03									
	(0.03)									
Spotted sucker	0.03									
	(0.03)									
Silver redhorse	1.35									
	(0.33)									
Golden redhorse	0.03									
	(0.03)									
Shorthead redhorse	0.17									
	(0.08)									
Yellow bullhead	0.03									
	(0.03)									
Channel catfish	0.06									
	(0.04)									
Northern pike	0.08									
	(0.05)									
White bass	1.96									
	(0.62)									
Rock bass	0.14									
	(0.07)									
Bluegill	1.21									
	(0.40)									
White crappie	0.03									
	(0.03)									
Black crappie	3.89									
	(0.93)									
Yellow perch	0.64									
	(0.23)									
Sauger	0.09									
	(0.05)									
Walleye	0.08									
	(0.06)									
Freshwater drum	12.35									
	(4.09)									

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MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 1.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by mini fyke netting in Pool 4 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Longnose gar										0.38
										(0.38)
Bowfin		0.10								0.39
		(0.07)								(0.39)
Gizzard shad		19.82								
		(18.60)								
Spotfin shiner		0.75				1.48				1.51
		(0.59)				(1.48)				(1.32)
Common carp		0.16								
		(0.12)								
Speckled chub										0.67
										(0.67)
Silver chub		0.05								1.51
		(0.05)								(0.82)
Golden shiner		0.13								
		(0.09)								
Emerald shiner		36.64				17.13				2639.78
		(29.01)				(16.88)				(1687.43)
Spottail shiner		0.49								
		(0.28)								
Mimic shiner						0.08				2.70
						(0.08)				(2.50)
Pugnose minnow		11.75								
		(7.74)								
Fathead minnow						0.08				
						(0.08)				
Bullhead minnow		0.55				0.70				0.19
		(0.20)				(0.70)				(0.19)
Quillback		0.11								
		(0.11)								
White sucker						0.08				
						(0.08)				
Smallmouth buffalo		0.05								
		(0.05)								
Bigmouth buffalo		0.05								
		(0.05)								
Silver redhorse		0.22								
		(0.13)								
Channel catfish										0.17
										(0.17)
Tadpole madtom		0.05								
		(0.05)								
Flathead catfish										0.17
										(0.17)
Brook silverside		0.06								
		(0.06)								
White bass		0.91				0.39				5.91
		(0.63)				(0.31)				(3.60)
Rock bass		0.25				0.17				
		(0.14)				(0.11)				
Green sunfish		0.10								0.36
		(0.10)								(0.23)
Bluegill		2.08				0.49				0.19
		(0.98)				(0.26)				(0.19)
Green sunfish x pumpkinseed						0.08				
						(0.08)				
Largemouth bass		0.23								
		(0.17)								
White crappie		0.11								0.33
		(0.07)								(0.33)

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SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 1.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by mini fyke netting in Pool 4 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Black crappie		0.40				0.08				0.19
		(0.29)				(0.08)				(0.19)
Mud darter		0.11								
		(0.08)								
Johnny darter		0.35				0.08				
		(0.30)				(0.08)				
Yellow perch		0.12								
		(0.08)								
Logperch		0.06				0.16				
		(0.06)				(0.11)				
River darter										0.33
										(0.33)
Sauger		0.05				0.08				
		(0.05)				(0.08)				
Walleye						0.08				
						(0.08)				
Freshwater drum		0.22				0.25				0.34
		(0.12)				(0.18)				(0.22)

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IMPO - Impounded, offshore
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MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 1.3.6. Mean catch-per-unit-effort and (standard error) for fishes collected by tandem mini fyke netting in Pool 4 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Gizzard shad	0.08 (0.06)									
Common carp	0.08 (0.04)									
Silver chub	0.12 (0.07)									
Emerald shiner	0.64 (0.29)									
Spottail shiner	1.67 (1.13)									
Weed shiner	0.03 (0.03)									
Pugnose minnow	0.09 (0.05)									
Bullhead minnow	1.11 (0.35)									
Quillback	0.03 (0.03)									
Silver redhorse	0.11 (0.06)									
Shorthead redhorse	0.08 (0.06)									
Black bullhead	0.03 (0.03)									
Tadpole madtom	0.03 (0.03)									
Trout-perch	0.11 (0.09)									
White bass	0.20 (0.12)									
Rock bass	0.06 (0.04)									
Bluegill	0.11 (0.07)									
Largemouth bass	0.03 (0.03)									
White crappie	0.08 (0.04)									
Black crappie	0.25 (0.10)									
Mud darter	0.14 (0.12)									
Johnny darter	0.12 (0.07)									
Yellow perch	0.08 (0.06)									
Sauger	0.03 (0.03)									
Walleye	0.05 (0.05)									
Freshwater drum	1.14 (0.46)									

Strata: BWCS - Backwater, contiguous, shoreline
BWCO - Backwater, contiguous, offshore
IMPS - Impounded, shoreline
IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 1.3.7. Mean catch-per-unit-effort and (standard error) for fishes collected by tandem hoop netting in Pool 4 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Chestnut lamprey										0.08 (0.08)
Shortnose gar					0.08 (0.05)					
Common carp					4.44 (1.36)	2.72 (1.09)	1.45 (0.71)			16.33 (6.26)
Silver chub					0.08 (0.06)					
River carpsucker						0.04 (0.04)				
White sucker					0.04 (0.04)					
Northern hog sucker					0.04 (0.04)					
Smallmouth buffalo					0.45 (0.14)	0.30 (0.17)				0.17 (0.11)
Bigmouth buffalo						0.05 (0.05)				
Silver redhorse							0.21 (0.12)			
Shorthead redhorse					0.71 (0.29)	0.29 (0.14)	0.87 (0.44)			0.25 (0.25)
Channel catfish					5.11 (2.12)	1.09 (0.41)	4.54 (1.91)			0.17 (0.11)
Flathead catfish							0.21 (0.17)			0.34 (0.11)
Northern pike							0.04 (0.04)			
White bass					0.25 (0.13)	0.09 (0.06)	0.20 (0.10)			0.25 (0.25)
Rock bass					0.33 (0.13)	0.04 (0.04)	0.18 (0.14)			
Bluegill					0.17 (0.07)	0.47 (0.22)	1.13 (0.58)			
White crappie					0.04 (0.04)	0.04 (0.04)	0.04 (0.04)			
Black crappie					0.60 (0.35)	0.64 (0.43)	0.76 (0.43)			0.92 (0.82)
Sauger						0.04 (0.04)				0.33 (0.25)
Walleye							0.04 (0.04)			
Freshwater drum					1.02 (0.80)	0.40 (0.21)	0.33 (0.25)			0.58 (0.24)

Strata: BWCS - Backwater, contiguous, shoreline
BWCO - Backwater, contiguous, offshore
IMPS - Impounded, shoreline
IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 1.3.8. Mean catch-per-unit-effort and (standard error) for fishes collected by seining in Pool 4 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Gizzard shad					0.83		2.04			
					(0.54)		(1.50)			
Spotfin shiner					1.08		4.42			
					(0.37)		(1.26)			
Common carp							0.08			
							(0.06)			
Silver chub					0.08		0.08			
					(0.08)		(0.08)			
Emerald shiner					74.33		107.38			
					(31.24)		(44.32)			
River shiner					1.54		2.13			
					(0.64)		(1.11)			
Spottail shiner					0.04		0.79			
					(0.04)		(0.37)			
Sand shiner							0.04			
							(0.04)			
Mimic shiner					4.42		4.75			
					(1.60)		(2.10)			
Pugnose minnow					0.17					
					(0.17)					
Fathead minnow							0.04			
							(0.04)			
Bullhead minnow					0.38		4.88			
					(0.16)		(2.10)			
Blacknose dace							0.04			
							(0.04)			
Quillback					0.38		3.25			
					(0.16)		(3.12)			
White sucker					0.21		0.33			
					(0.17)		(0.33)			
Silver redhorse							0.04			
							(0.04)			
Shorthead redhorse							0.71			
							(0.36)			
Tadpole madtom							0.04			
							(0.04)			
Brook silverside							0.17			
							(0.10)			
White bass					0.75		0.79			
					(0.28)		(0.38)			
Rock bass							0.13			
							(0.09)			
Green sunfish					0.04					
					(0.04)					
Bluegill							0.25			
							(0.12)			
Smallmouth bass					0.08		0.29			
					(0.06)		(0.19)			
Largemouth bass							0.38			
							(0.18)			
Western sand darter					0.21		0.13			
					(0.13)		(0.07)			
Johnny darter					0.13		2.54			
					(0.07)		(0.71)			
Yellow perch					0.08		0.08			
					(0.08)		(0.08)			
Logperch					0.17		2.13			
					(0.10)		(0.92)			
River darter					1.33		3.38			
					(0.76)		(2.11)			

Strata: BWCS - Backwater, contiguous, shoreline
BWCO - Backwater, contiguous, offshore
IMPS - Impounded, shoreline
IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 1.3.8. Mean catch-per-unit-effort and (standard error) for fishes collected by seining in Pool 4 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error. Table page: 2

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Sauger					0.04		0.13			
					(0.04)		(0.09)			
Walleye					0.04					
					(0.04)					

Strata: BWCS - Backwater, contiguous, shoreline
BWCO - Backwater, contiguous, offshore
IMPS - Impounded, shoreline
IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 1.3.9. Mean catch-per-unit-effort and (standard error) for fishes collected by bottom trawling in Pool 4 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Shovelnose sturgeon										0.08 (0.08)
Common carp								0.03 (0.03)		0.17 (0.17)
Speckled chub					0.08 (0.06)			0.03 (0.03)		
Silver chub					0.08 (0.06)			0.06 (0.04)		0.25 (0.18)
River shiner					0.04 (0.04)					
Mimic shiner					0.08 (0.08)					
Blue sucker										0.08 (0.08)
Shorthead redhorse					0.13 (0.07)					
Channel catfish					0.29 (0.20)			0.11 (0.07)		0.17 (0.11)
Flathead catfish								0.03 (0.03)		0.08 (0.08)
Trout-perch					0.04 (0.04)					
White bass					0.67 (0.67)			0.03 (0.03)		
Bluegill					0.08 (0.08)					
Smallmouth bass					0.08 (0.06)					
Western sand darter								0.03 (0.03)		
Yellow perch					0.04 (0.04)					
Sauger								0.06 (0.04)		
Walleye					0.08 (0.08)			0.06 (0.04)		
Freshwater drum					0.04 (0.04)			0.11 (0.05)		0.33 (0.19)

Strata: BWCS - Backwater, contiguous, shoreline
BWCO - Backwater, contiguous, offshore
IMPS - Impounded, shoreline
IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

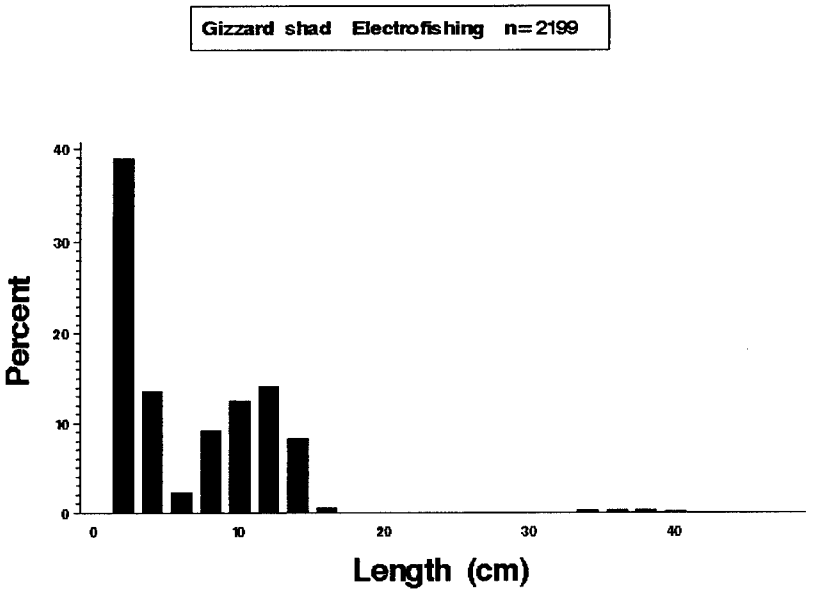

Figure 1.2. Length distributions (*length*) as a percentage of catch (*percent*) for gizzard shad (*Dorosoma cepedianum*) collected by electrofishing in Upper Mississippi River Pool 4 during 1992 .

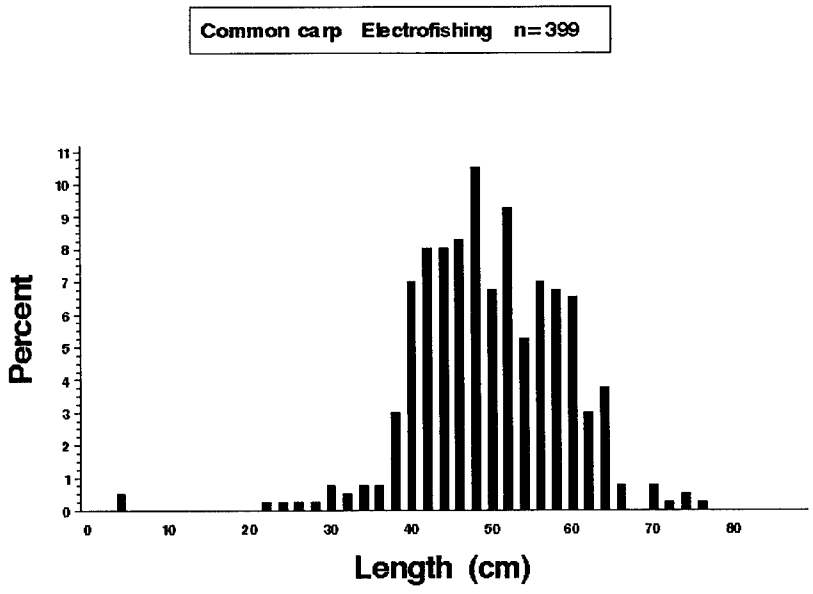

Figure 1.3. Length distributions (*length*) as a percentage of catch (*percent*) for common carp (*Cyprinus carpio*) collected by electrofishing in Upper Mississippi River Pool 4 during1992.

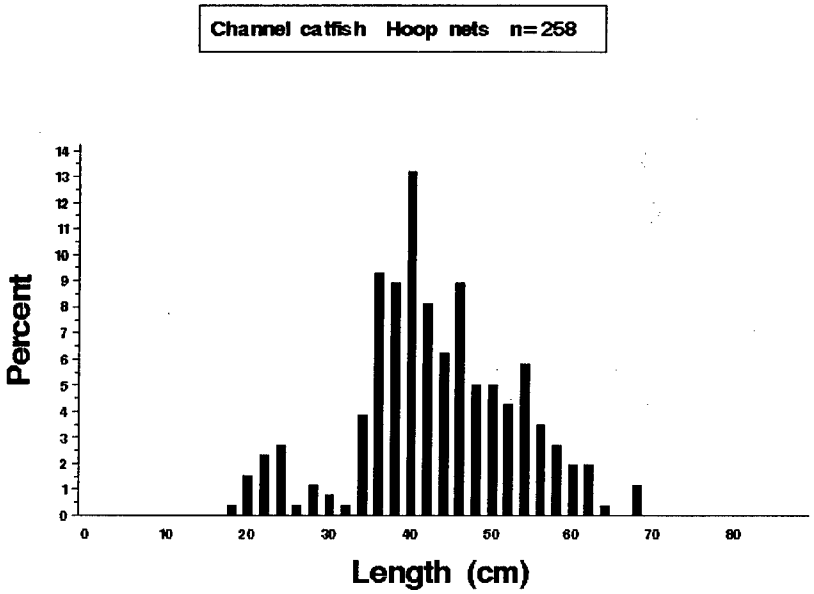

Figure 1.4. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by large and small hoop netting in Upper Mississippi River Pool 4 during 1992.

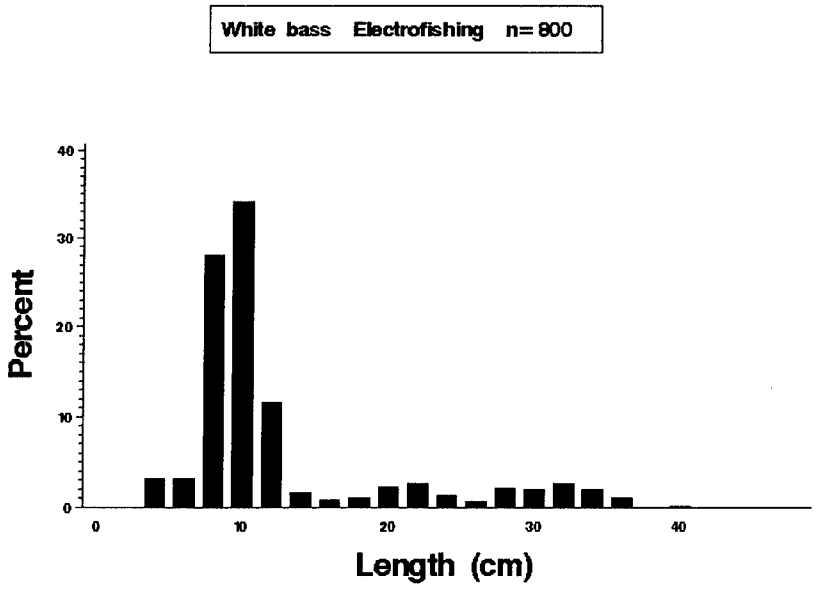

Figure 1.5. Length distributions (*length*) as a percentage of catch (*percent*) for white bass (*Morone chrysops*) collected by electrofishing in Upper Mississippi River Pool 4 during 1992 .

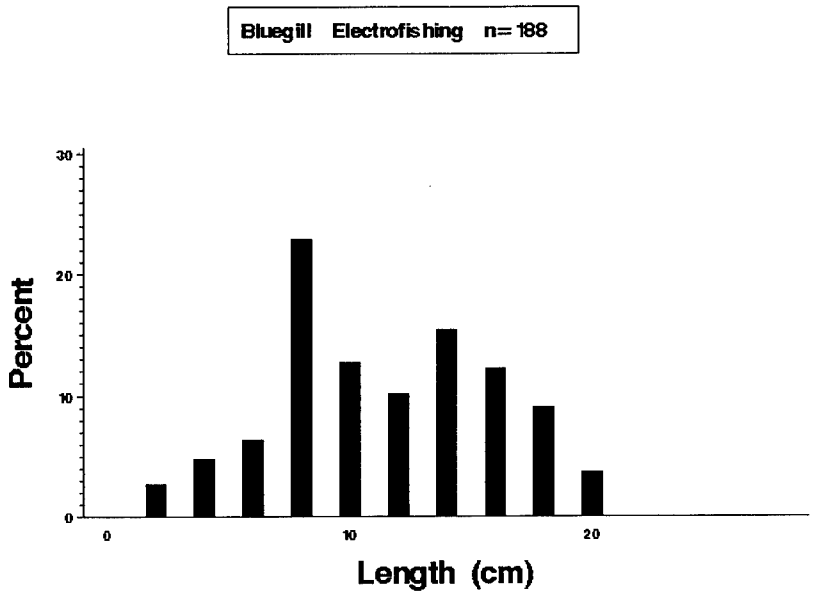

Figure 1.6. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by electrofishing in Upper Mississippi River Pool 4 during 1992.

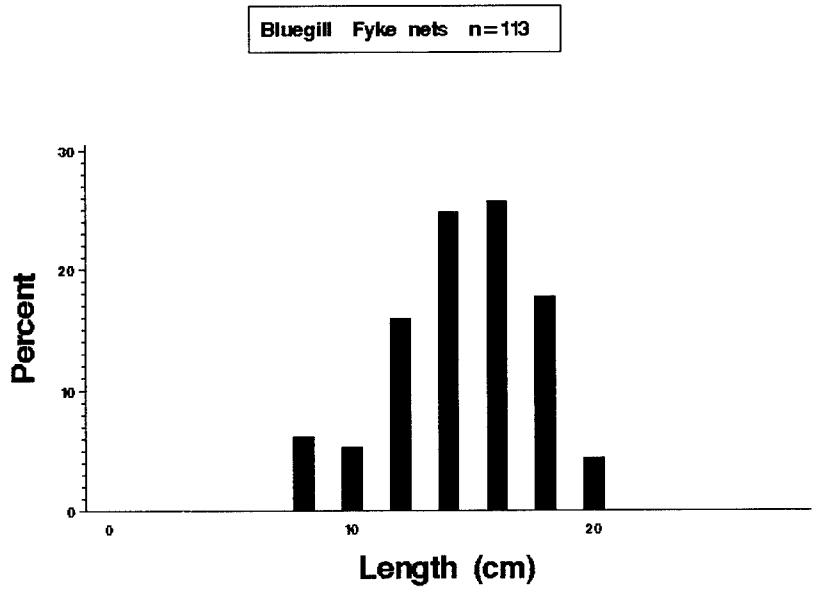

Figure 1.7. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by fyke netting in Upper Mississippi River Pool 4 during 1992.

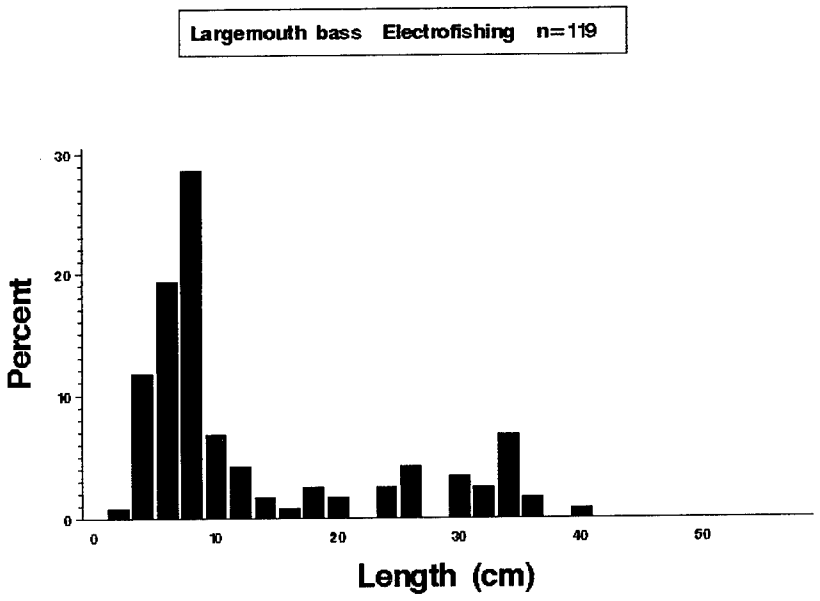

Figure 1.8. Length distributions (*length*) as a percentage of catch (*percent*) for largemouth bass (*Micropterus salmoides*) collected by electrofishing in Upper Mississippi River Pool 4 during 1992.

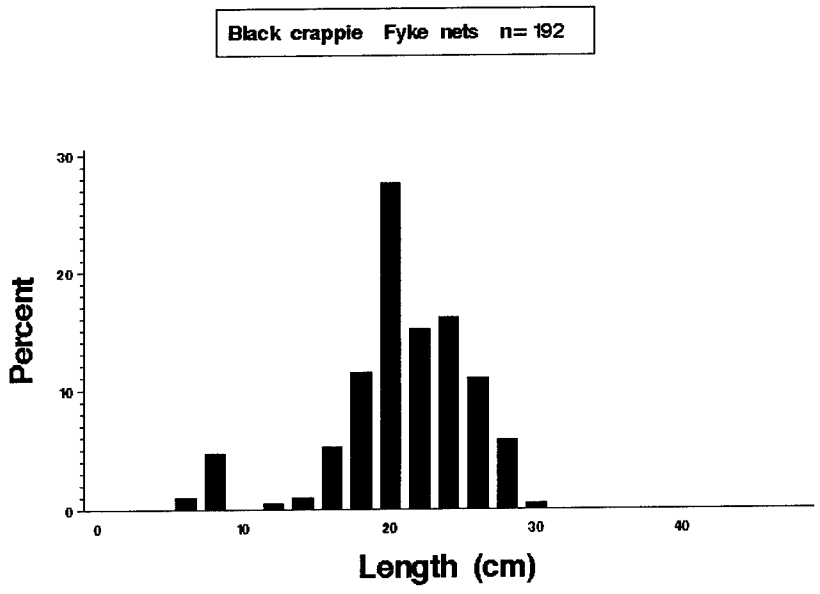

Figure 1.9. Length distributions (*length*) as a percentage of catch (*percent*) for black crappie (*Pomoxis nigromaculatus*) collected by electrofishing in Upper Mississippi River Pool 4 during 1992.

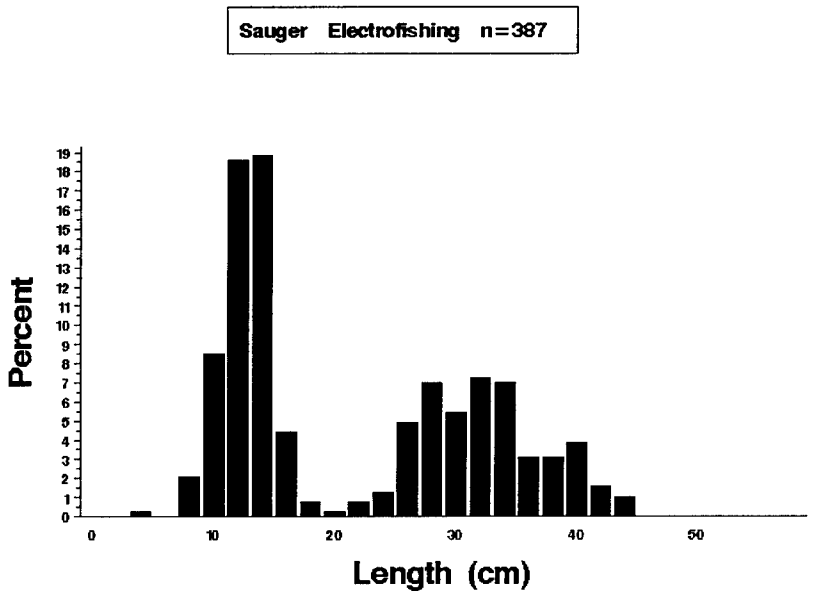

Figure 1.10. Length distributions (*length*) as a percentage of catch (*percent*) for sauger (*Stizostedion canadense*) collected by electrofishing in Upper Mississippi River Pool 4 during 1992.

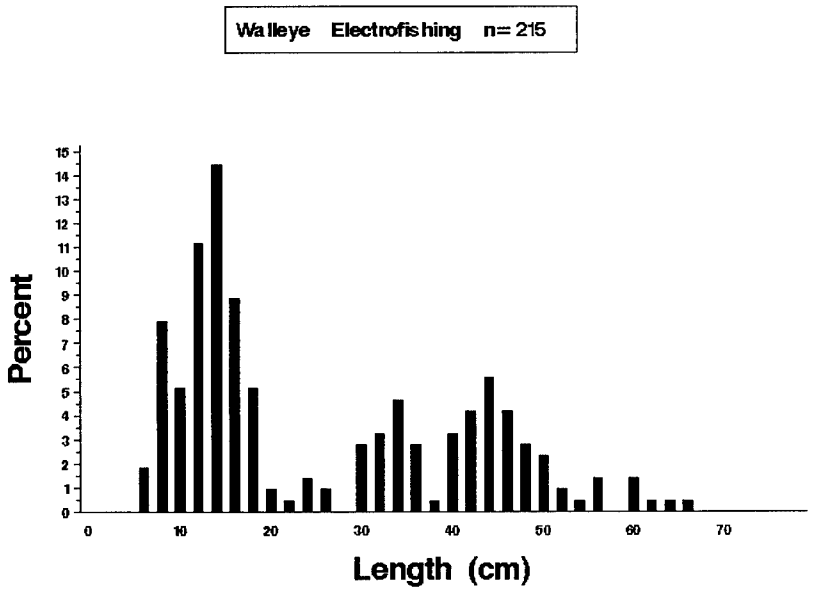

Figure 1.11. Length distributions (*length*) as a percentage of catch (*percent*) for walleye (*Stizostedion vitreum*) collected by electrofishing in Upper Mississippi River Pool 4 during 1992.

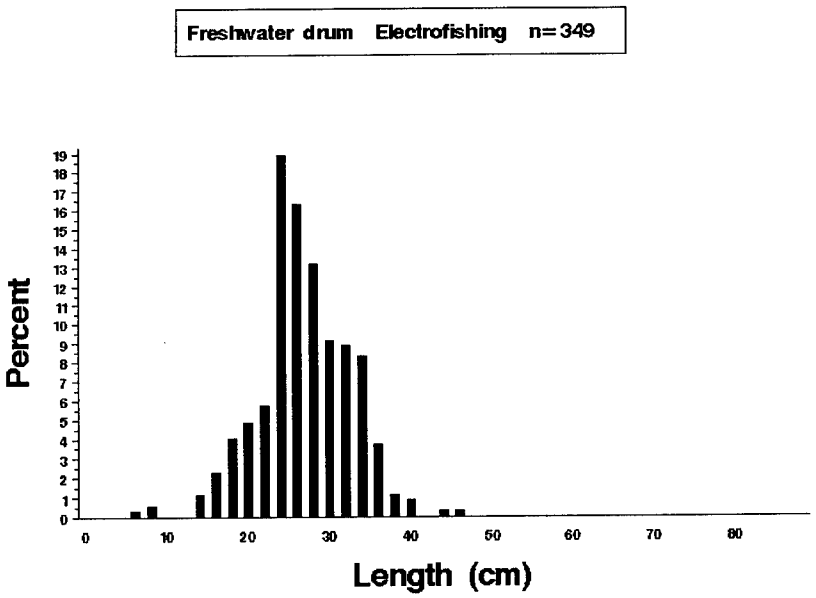

Figure 1.12. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by electrofishing in Upper Mississippi River Pool 4 during 1992.

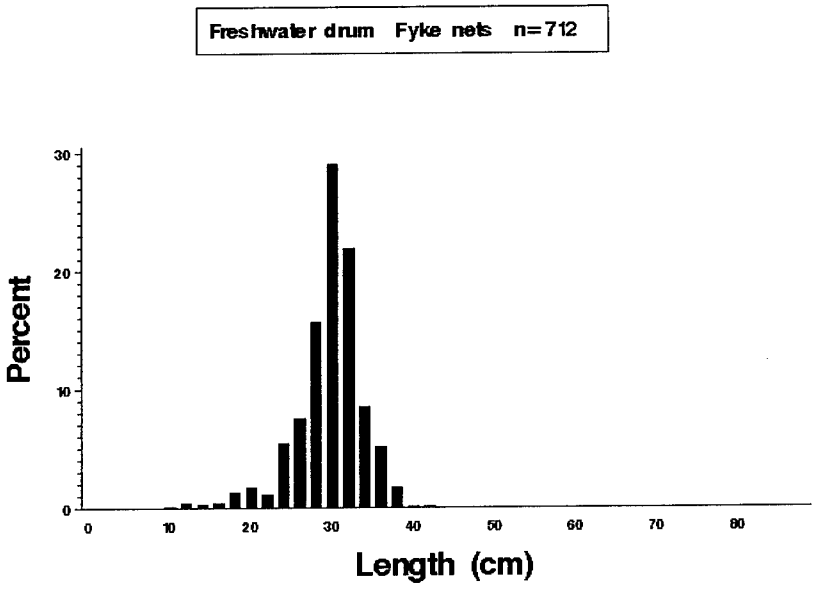

Figure 1.13. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by fyke netting in Upper Mississippi River Pool 4 during 1992.

Chapter 2. Pool 8, Upper Mississippi River

by

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Hydrograph

The 1992 hydrograph for Pool 8 (Figure 2.1) indicated normal water levels for most of the year. The river crested at flood stage in March, then again just below that level in early May. This high water period in May was rapidly followed by a decline for the next 2 months to levels significantly below the historical mean. Though variable, water levels did not negatively affect fish sampling during 1992.

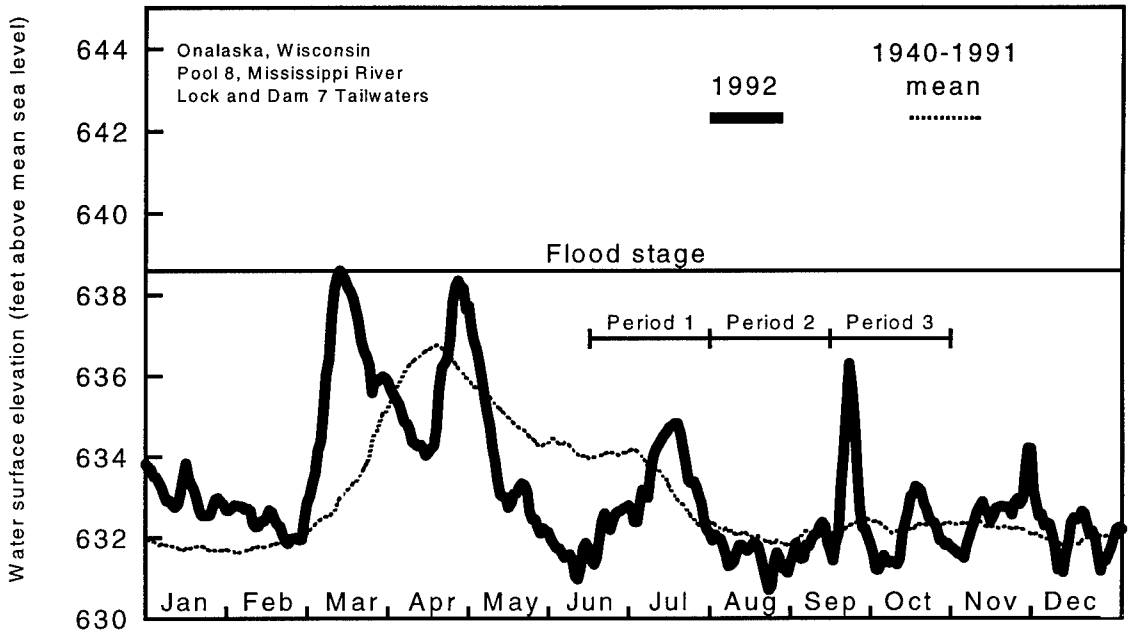

Figure 2.1. Daily water surface elevation from Lock and Dam 7 for Pool 8, Upper Mississippi River, during 1992 and mean elevation since 1940. The U.S. Army Corps of Engineers discharge data were obtained from the Environmental Management Technical Center (Wlosinski et al. 1995).

Summary of Sampling Effort

We made 396 fish collections in Pool 8 during 1992. Gear allocations across strata remained consistent, totaling 132 collections for each of the three sampling periods (Table 2.1). All of the collections were from fixed sites in the BWCS, IMPO, IMPS, MCBU, MCBW, SCB, CTR, and TWZ strata. The MCBW, BWCS, and MCBU strata received the most sampling effort.

Total Catch by Gear

We collected 54,277 fish representing 70 species and three hybrid crosses in 1992 (Table 2.2). Of this total, 7,676 fish <30 mm long were identified only to family or genus. The five most abundant species in our samples were emerald shiner (8,239), white bass (5,764), bluegill (5,285), gizzard shad (4,428), and spotfin shiner (2,299). Total species (excluding hybrids) collected by gear type were day electrofishing (55), night

electrofishing (56), fyke netting (37), tandem fyke netting (9), mini fyke netting (43), tandem mini fyke netting (9), seining (45), tandem hoop netting (21), and trawling (24). Fish distribution records for the Upper Mississippi River (Pitlo et al. 1995) document 99 fish species from Pool 8. Our species total before the 1992 season was 70. Four new species—blue sucker, central stoneroller, brook stickleback, and crystal darter—were added in 1992, bringing the cumulative total to 74. During 1992, we collected 1 pallid shiner and 2 crystal darters, which are on Wisconsin's endangered species list. We also collected 3 speckled chubs, 33 blue suckers, and 176 river redhorse in 1992, all listed as threatened species in Wisconsin.

Fixed Sampling, Mean *C/f* by Gear and Stratum

Day Electrofishing

For day electrofishing (Table 2.3.1) in the BWCS stratum, bluegill (24.09) was the most abundant fish. White bass (9.02) were most abundant in the MCBU stratum, and gizzard shad (2.08, 8.55, and 9.91) were most abundant in the IMPO, IMPS, and MCBW strata.

Night Electrofishing

For night electrofishing (Table 2.3.2), white bass had the highest *C/f* within three strata: BWCS (45.29), MCBU (31.61), and SCB (27.00). Gizzard shad had the highest mean *C/f* in the MCBW (36.32) and TWZ (132.97) strata.

Fyke Net

Fyke nets were deployed in three strata (Table 2.3.3). White bass had the highest *C/f* in the BWCS (79.78), IMPS (17.50), and TWZ (84.64) strata.

Tandem Fyke Net

Tandem fyke netting was conducted at only one site in the IMPO stratum (Table 2.3.4). White bass (7.47) had the highest mean *C/f*.

Mini Fyke Net

Bluegill (209.64) dominated the BWCS *C/f* for mini fyke nets (Table 2.3.5). White bass (3.66) was most abundant for mini fyke nets in the IMPS stratum. Spotfin shiner (52.06) had the highest *C/f* in the MCBW stratum, and gizzard shad (25.41) had the highest *C/f* in the TWZ stratum.

Tandem Mini Fyke Net

Tandem mini fyke netting was conducted at only one site in the IMPO stratum (Table 2.3.6). Freshwater drum (11.68) had the highest *C/f*.

Tandem Hoop Net

For tandem hoop nets (Table 2.3.7), smallmouth buffalo (2.80) had the highest *C/f* in the MCBU stratum. White bass (0.47) was most abundant in the MCBW stratum. Freshwater drum (4.54) was most abundant in the SCB stratum, and channel catfish (10.65) was most abundant in the TWZ stratum.

Seine

For seining (Table 2.3.8), gizzard shad (46.50) had the highest *C/f* in the BWCS stratum. In the MCBU and SCB strata, emerald shiner (23.25 and 302.71) was most abundant.

Trawl

Bottom trawling was conducted in three strata (Table 2.3.9). Freshwater drum had the highest mean *C/f* in all three strata: MCBU (6.00), CTR (23.11), and TWZ (23.75).

Length Distributions of Selected Species

Length distributions are presented for selected species in Figures 2.2 to 2.19. The length distributions presented may be limited by the size selectiveness of the particular gear. Care should be used when trying to interpret length distributions from samples <100 (Anderson and Neumann 1996); they are presented in this report because of local interest in the species by river managers.

Gizzard Shad

Most gizzard shad collected by electrofishing in Pool 8 during 1992 were less than 15 cm long (Figure 2.2). Sample size was 3,258 fish.

Common Carp

The electrofishing length distribution from 568 common carp (Figure 2.3) showed a large group of fish from 42 to 60 cm long, with relatively few fish outside this range. Although there were few common carp between 15 and 40 cm long, about 12% of the common carp collected in 1992 were juveniles (<15 cm). This was noteworthy as juvenile common carp are rarely collected by LTRMP sampling within Pool 8.

Smallmouth Buffalo

Smallmouth buffalo collected by electrofishing showed a different picture from those collected by hoop nets. The 380 smallmouth buffalo collected by electrofishing (Figure 2.4) ranged mostly from 5 to 15 cm long with few large adults collected. We collected 155 smallmouth buffalo in tandem hoop nets (Figure 2.5) in 1992. Most smallmouth buffalo collected in hoop nets were between 40 and 50 cm long.

Channel Catfish

The sample size of 73 channel catfish collected by electrofishing was too small to accurately define the size structure for channel catfish in Pool 8 (Figure 2.6). The length range of catfish collected by electrofishing was 10–60 cm. The length distribution of 211 channel catfish collected in hoop nets (Figure 2.7) was similar to that of electrofishing, showing most of the fish from 15 to 25 cm long, and an even distribution from about 25 to 45 cm long. Some channel catfish as long as 65 cm were present in both gear types.

Northern Pike

The 1992 northern pike length distribution, represented as 30 fish collected by electrofishing (Figure 2.8), indicated nearly equal representation from 30 to 100 cm long. The most abundant size class was the 60–70-cm-long group. The length distribution for 47 northern pike collected by fyke netting (Figure 2.9) shows a smaller range of lengths, from 40 to 90 cm, again with the largest percentage around 70 cm.

White Bass

The most abundant length of 2,329 white bass we collected by electrofishing in 1992 (Figure 2.10) was 10 cm. Although few fish longer than 15 cm were collected, the length range for white bass was 1 to 40 cm.

Bluegill

We collected 1,384 bluegills by electrofishing in 1992 (Figure 2.11). The electrofishing distribution was broadly represented by fish from 1 to 20 cm long. The 1,279 bluegills collected in fyke nets (Figure 2.12) showed an almost identical distribution to the electrofishing catch, except that juveniles were not effectively sampled. The most abundant length for both gear types was 10 cm.

Largemouth Bass

The electrofishing length distribution from 434 largemouth bass (Figure 2.13) showed many small fish and a well-defined bimodal distribution, with modes at 10 and 35 cm. About 15% of the catch exceeded 35 cm in length.

White Crappie

The sample size for white crappie collected in fyke nets was 114 fish. The length distribution for white crappie (Figure 2.14) was nearly bell-shaped, with the most abundant range from 15 to 25 cm.

Black Crappie

We collected 1,672 black crappie in fyke nets in 1992 (Figure 2.15). Most of the fish collected were from 8 to 26 cm long. No black crappies >30 cm long were collected.

Sauger

The sample size for sauger collected by electrofishing in 1992 was 1,500 (Figure 2.16). The distribution was unimodal, with the most abundant group at 14 cm in length. Few sauger >30 cm long were collected.

Walleye

We collected 717 walleye during 1992 by electrofishing. Like the sauger distribution, the length distribution for walleye (Table 2.17) was unimodal, with the largest group of fish at 18 cm long. About 10% of the catch was longer than 40 cm.

Freshwater Drum

The length distribution for 364 freshwater drum collected by electrofishing (Figure 2.18) illustrates a large group of fish at 12–14 cm long, with the rest evenly represented by 1–5% in each length range up to 50 cm. The 38 freshwater drum collected in fyke nets (Figure 2.19) showed major groups at 12, 20, and 30 cm in length.

Table 2.1. Allocation of fish sampling effort among strata by the Long Term Resource Monitoring Program in Pool 8 of the Mississippi River during 1992. Table entries are numbers of successfully completed standardized monitoring collections.

Sampling period = 1: June 15 - July 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	CTR	TWZ	TOTAL
Day electrofishing	8			4	6	2	2			22
Fyke net	8					2			2	12
Tandem hoop net			4	4	6				2	16
Mini fyke net	4				6	2			2	14
Night electrofishing	4		4	4	6				2	20
Seine	4		8	8						20
Trawling				8				12	4	24
Tandem fyke net							2			2
Tandem mini fyke net							2			2
SUBTOTAL	28	0	16	28	24	6	6	12	12	132

Sampling period = 2: August 1 - September 14

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	CTR	TWZ	TOTAL
Day electrofishing	8			4	6	2	2			22
Fyke net	8					2			2	12
Tandem hoop net			4	4	6				2	16
Mini fyke net	4				6	2			2	14
Night electrofishing	4		4	4	6				2	20
Seine	4		8	8						20
Trawling				8				12	4	24
Tandem fyke net							2			2
Tandem mini fyke net							2			2
SUBTOTAL	28	0	16	28	24	6	6	12	12	132

Sampling period = 3: September 15 - October 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	CTR	TWZ	TOTAL
Day electrofishing	8			4	6	2	2			22
Fyke net	8					2			2	12
Tandem hoop net			4	4	6				2	16
Mini fyke net	4				6	2			2	14
Night electrofishing	4		4	4	6				2	20
Seine	4		8	8						20
Trawling				8				12	4	24
Tandem fyke net							2			2
Tandem mini fyke net							2			2
SUBTOTAL	28	0	16	28	24	6	6	12	12	132
	84	0	48	84	72	18	18	36	36	396

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
CTR - Main channel trough.
TWZ - Tailwater.

Table 2.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1992 in Pool 8 of the Mississippi River. See Table 2.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	H	T	TOTAL
1	Chestnut lamprey	Ichthyomyzon castaneus	-	5	1	-	-	-	-	-	-	6
2	Silver lamprey	Ichthyomyzon unicuspis	-	4	-	-	-	-	-	1	-	5
3	Unidentified lamprey	Petromyzontidae sp.	-	1	-	-	-	-	-	-	-	1
4	Shovelnose sturgeon	Scaphirhynchus platorynchus	-	-	-	-	-	-	-	-	29	29
5	Longnose gar	Lepisosteus osseus	12	34	9	-	2	-	1	-	3	61
6	Shortnose gar	Lepisosteus platostomus	5	7	45	-	1	-	-	1	-	59
7	Bowfin	Amia calva	22	8	68	-	1	-	-	-	-	99
8	Mooneye	Hiodon tergisus	16	162	1	-	-	-	1	-	17	197
9	American eel	Anguilla rostrata	2	-	-	-	-	-	-	-	-	2
10	Gizzard shad	Dorosoma cepedianum	871	2627	14	7	172	-	731	-	6	4428
11	Central stoneroller	Campostoma anomalum	-	1	-	-	-	-	-	-	-	1
12	Spotfin shiner	Cyprinella spiloptera	266	344	1	-	997	-	690	-	1	2299
13	Common carp	Cyprinus carpio	189	381	61	3	10	2	38	75	6	765
14	Mississippi silvery minnow	Hybognathus nuchalis	-	1	-	-	-	-	55	-	-	56
15	Speckled chub	Macrhybopsis aestivalis	-	-	-	-	-	-	-	-	3	3
16	Silver chub	Macrhybopsis storeriana	1	18	-	-	-	-	-	3	25	47
17	Golden shiner	Notemigonus crysoleucas	16	2	8	-	12	-	1	-	-	39
18	Pallid shiner	Notropis amnis	-	-	-	-	-	-	1	-	-	1
19	Emerald shiner	Notropis atherinoides	203	168	-	-	9	-	7859	-	-	8239
20	River shiner	Notropis blennius	58	88	-	-	2	-	1127	-	-	1275
21	Spottail shiner	Notropis hudsonius	35	184	-	-	30	-	201	-	-	450
22	Sand shiner	Notropis stramineus	-	2	-	-	-	-	13	-	-	15
23	Weed shiner	Notropis texanus	-	-	-	-	1	-	1	-	-	2
24	Mimic shiner	Notropis volucellus	2	120	-	-	9	-	497	-	1	629
25	Pugnose minnow	Opsopoeodus emiliae	14	3	-	-	422	-	28	-	-	467
26	Bluntnose minnow	Pimephales notatus	-	-	-	-	-	-	7	-	-	7
27	Bullhead minnow	Pimephales vigilax	268	350	-	-	179	-	608	-	-	1405
28	Unidentified minnow	Cyprinidae sp.	-	-	-	-	-	-	1	-	-	1
29	River carpsucker	Carpiodes carpio	1	13	7	-	-	-	-	-	-	21
30	Quillback	Carpiodes cyprinus	98	362	-	-	4	2	1166	1	1	1634
31	Highfin carpsucker	Carpiodes velifer	2	8	-	-	-	-	-	-	-	10
32	Unidentified carpsucker	Carpiodes sp.	-	-	-	-	12	-	7088	-	1	7101
33	White sucker	Catostomus commersoni	-	-	1	-	-	-	-	-	-	1
34	Blue sucker	Cycleptus elongatus	5	6	-	-	-	-	21	-	1	33
35	Smallmouth buffalo	Ictiobus bubalus	69	311	31	-	4	-	299	155	-	869
36	Bigmouth buffalo	Ictiobus cyprinellus	5	5	-	1	-	-	-	-	-	11
37	Unidentified buffalo	Ictiobus sp.	-	-	-	-	-	-	34	-	-	34
38	Spotted sucker	Minytrema melanops	108	66	34	-	9	-	1	-	-	218
39	Silver redhorse	Moxostoma anisurum	210	443	108	12	9	-	77	36	11	906
40	River redhorse	Moxostoma carinatum	101	75	-	-	-	-	-	-	-	176

Gears: D - Day electrofishing
N - Night electrofishing
F - Fyke netting
M - Mini fyke netting
T - Trawling (4.8-m bottom trawl)
S - Seining
H - Tandem hoop netting
X - Tandem fyke netting
Y - Tandem min fyke netting

Table 2.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1992 in Pool 8 of the Mississippi River. See Table 2.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	H	T	TOTAL
41	Golden redhorse	Moxostoma erythrurum	39	107	3	-	-	-	1	2	-	152
42	Shorthead redhorse	Moxostoma macrolepidotum	316	657	36	9	12	2	69	158	15	1274
43	Unidentified redhorse	Moxostoma sp.	2	4	-	-	25	2	453	-	1	487
44	Black bullhead	Ameiurus melas	-	-	21	-	1	-	-	-	-	22
45	Yellow bullhead	Ameiurus natalis	1	-	7	-	3	-	-	-	-	11
46	Brown bullhead	Ameiurus nebulosus	-	-	1	-	1	-	-	-	-	2
47	Channel catfish	Ictalurus punctatus	10	63	7	2	-	-	-	211	180	473
48	Tadpole madtom	Noturus gyrinus	1	-	-	-	2	-	-	-	-	3
49	Flathead catfish	Pylodictis olivaris	2	10	7	-	-	-	-	14	1	34
50	Northern pike	Esox lucius	9	21	47	-	1	-	-	1	-	79
51	Trout-perch	Percopsis omiscomaycus	1	5	-	-	-	-	2	-	-	8
52	Brook silverside	Labidesthes sicculus	34	40	-	-	-	-	38	-	-	112
53	Brook stickleback	Culaea inconstans	-	-	-	-	-	-	2	-	-	2
54	White bass	Morone chrysops	271	2059	2596	90	165	47	414	42	80	5764
55	Yellow bass	Morone mississippiensis	-	-	2	-	-	-	-	-	-	2
56	Rock bass	Ambloplites rupestris	13	34	4	-	-	-	2	1	-	54
57	Green sunfish	Lepomis cyanellus	8	8	4	-	1	-	1	-	-	22
58	Pumpkinseed	Lepomis gibbosus	11	1	8	-	1	-	1	-	-	22
59	Warmouth	Lepomis gulosus	3	-	1	-	2	-	-	-	-	6
60	Orangespotted sunfish	Lepomis humilis	25	24	8	-	2	-	3	-	-	62
61	Bluegill	Lepomis macrochirus	737	657	1279	-	2558	1	49	4	-	5285
62	Green sunfish x warmouth	L. cyanellus x L. gulosus	-	-	1	-	-	-	-	-	-	1
63	Pumpkinseed x bluegill	L. gibbosus x L. macrochirus	-	-	-	-	4	-	-	-	-	4
64	Unidentified Lepomis	Lepomis sp.	8	2	-	-	38	-	1	-	-	49
65	Smallmouth bass	Micropterus dolomieu	78	220	-	-	3	-	53	2	-	356
66	Largemouth bass	Micropterus salmoides	302	144	11	-	2	-	28	-	-	487
67	White crappie	Pomoxis annularis	15	1	114	-	29	-	-	1	-	160
68	Black crappie	Pomoxis nigromaculatus	97	89	1672	-	50	-	6	32	4	1950
69	White x black crappie	P. annulais x P. nigromaculatus	-	-	-	-	-	-	-	3	-	3
70	Crystal darter	Ammocrypta asprella	-	-	-	-	-	-	-	-	2	2
71	Western sand darter	Ammocrypta clara	4	1	-	-	-	-	109	-	-	114
72	Mud darter	Etheostoma asprigene	7	11	-	-	5	-	71	-	-	94
73	Johnny darter	Etheostoma nigrum	70	51	-	-	7	1	353	-	-	482
74	Yellow perch	Perca flavescens	163	87	47	-	3	-	59	-	-	359
75	Logperch	Percina caprodes	88	80	-	-	47	4	153	-	4	376
76	Slenderhead darter	Percina phoxocephala	1	1	-	-	2	1	-	-	1	6
77	River darter	Percina shumardi	1	16	-	-	29	-	36	-	2	84
78	Unidentified Percidae	Perdidae sp.	-	-	-	-	-	-	-	-	2	2
79	Sauger	Stizostedion canadense	53	1447	10	1	5	-	4	3	12	1535
80	Walleye	Stizostedion vitreum	79	638	13	-	1	-	9	4	6	750

Gears: D - Day electrofishing
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Table 2.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1992 in Pool 8 of the Mississippi River. See Table 2.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	H	T	TOTAL
81	Freshwater drum	Aplodinotus grunniens	76	288	27	11	11	139	9	162	1261	1984
82	Unidentified	Unidentified	1	-	-	-	-	-	-	-	-	1
			5105	12565	6315	136	4895	201	22472	912	1676	54277

Gears: D - Day electrofishing
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Table 2.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by day electrofishing in Pool 8 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Longnose gar			0.17 (0.17)	0.16 (0.16)		0.29 (0.27)				
Shortnose gar						0.14 (0.08)				
Bowfin		0.72 (0.22)			0.08 (0.08)					
Mooneye		0.04 (0.04)	0.37 (0.23)		0.55 (0.32)	0.17 (0.09)				
American eel			0.33 (0.33)							
Gizzard shad		16.83 (8.28)	2.08 (1.31)	8.55 (6.56)	1.29 (0.74)	9.91 (4.78)				
Spotfin shiner		8.73 (6.02)		0.43 (0.29)	2.53 (1.10)	0.16 (0.16)				
Common carp		4.28 (1.36)	1.66 (1.28)	0.69 (0.69)	1.66 (0.48)	0.64 (0.30)				
Silver chub					0.08 (0.08)					
Golden shiner		0.55 (0.30)								
Emerald shiner		3.14 (1.45)		0.16 (0.16)	7.16 (6.10)	0.70 (0.43)				
River shiner		0.11 (0.09)			3.96 (1.49)	0.17 (0.12)				
Spottail shiner		1.16 (0.54)		0.41 (0.28)						
Mimic shiner		0.07 (0.05)								
Pugnose minnow		0.42 (0.24)								
Bullhead minnow		9.55 (4.50)			0.57 (0.29)	0.09 (0.06)				
River carpsucker						0.03 (0.03)				
Quillback		1.84 (0.81)			2.39 (1.04)	0.20 (0.07)				
Highfin carpsucker						0.07 (0.07)				
Blue sucker				0.76 (0.61)						
Smallmouth buffalo		1.95 (0.76)		0.33 (0.33)	0.08 (0.08)	0.12 (0.05)				
Bigmouth buffalo		0.04 (0.04)				0.14 (0.07)				
Spotted sucker		3.52 (0.78)				0.03 (0.03)				
Silver redhorse		1.77 (0.42)	0.72 (0.37)		0.97 (0.59)	4.32 (0.88)				
River redhorse		0.01 (0.01)	0.31 (0.20)			2.78 (0.45)				
Golden redhorse		0.83 (0.36)			0.16 (0.11)	0.43 (0.14)				
Shorthead redhorse		2.38 (0.54)	0.86 (0.48)	1.00 (0.52)	0.99 (0.60)	5.97 (1.63)				
Yellow bullhead		0.04 (0.04)								
Channel catfish		0.03 (0.03)				0.29 (0.14)				
Tadpole madtom		0.03 (0.03)								

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Table 2.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by day electrofishing in Pool 8 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Flathead catfish			0.18			0.04				
			(0.18)			(0.04)				
Northern pike		0.21				0.07				
		(0.08)				(0.05)				
Trout-perch		0.03								
		(0.03)								
Brook silverside		1.16								
		(0.76)								
White bass		3.92	0.83	3.22	9.02	0.63				
		(0.92)	(0.48)	(1.18)	(2.81)	(0.23)				
Rock bass		0.22			0.31					
		(0.11)			(0.21)					
Green sunfish		0.23			0.17					
		(0.10)			(0.17)					
Pumpkinseed		0.42								
		(0.27)								
Warmouth		0.11								
		(0.08)								
Orangespotted sunfish		0.72								
		(0.22)								
Bluegill		24.09		0.33	1.47	0.09				
		(6.63)		(0.33)	(0.76)	(0.07)				
Smallmouth bass		0.92		0.32	0.21	1.33				
		(0.33)		(0.20)	(0.21)	(0.27)				
Largemouth bass		9.54			0.48					
		(3.22)			(0.33)					
White crappie		0.46								
		(0.20)								
Black crappie		3.03		0.26	0.33	0.02				
		(0.87)		(0.26)	(0.26)	(0.02)				
Western sand darter					0.08	0.09				
					(0.08)	(0.09)				
Mud darter		0.22								
		(0.14)								
Johnny darter		1.92		0.13	0.22					
		(0.57)		(0.13)	(0.16)					
Yellow perch		4.88		0.28	0.32					
		(1.99)		(0.28)	(0.14)					
Logperch		2.74			0.16	0.20				
		(0.92)			(0.11)	(0.12)				
Slenderhead darter						0.03				
						(0.03)				
River darter				0.14						
				(0.14)						
Sauger		1.03		0.44	0.81	0.17				
		(0.24)		(0.20)	(0.21)	(0.11)				
Walleye		1.57		0.44		1.01				
		(0.63)		(0.20)		(0.40)				
Freshwater drum		1.10	0.18	1.19	1.50	0.29				
		(0.62)	(0.18)	(0.57)	(1.18)	(0.09)				

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IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
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SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 2.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by night electrofishing in Pool 8 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Chestnut lamprey		0.15					0.22			
		(0.10)					(0.16)			
Silver lamprey		0.07					0.07			0.26
		(0.07)					(0.07)			(0.17)
Longnose gar		0.28			0.14	0.47	0.87			
		(0.19)			(0.10)	(0.22)	(0.35)			
Shortnose gar		0.12			0.24	0.06	0.08			
		(0.08)			(0.17)	(0.06)	(0.08)			
Bowfin		0.26					0.08			0.36
		(0.14)					(0.08)			(0.25)
Mooneye		0.86			5.02	0.78	2.17			4.50
		(0.45)			(2.25)	(0.20)	(1.30)			(2.37)
Gizzard shad		21.15			1.12	36.32	3.72			132.97
		(9.49)			(0.70)	(35.91)	(1.56)			(84.73)
Central stoneroller										0.13
										(0.13)
Spotfin shiner		10.60			2.79	0.04	9.09			0.25
		(5.32)			(1.42)	(0.04)	(3.00)			(0.25)
Common carp		5.73			0.91	0.46	16.20			6.29
		(0.97)			(0.39)	(0.21)	(7.38)			(2.32)
Mississippi silvery minnow							0.08			
							(0.08)			
Silver chub					0.59	0.10	0.38			0.34
					(0.26)	(0.06)	(0.21)			(0.23)
Golden shiner		0.11								
		(0.11)								
Emerald shiner		2.72			3.47	0.03	5.37			1.85
		(0.79)			(0.95)	(0.03)	(2.60)			(0.56)
River shiner		0.32			2.32	0.13	3.81			0.25
		(0.12)			(1.60)	(0.13)	(1.24)			(0.25)
Spottail shiner		9.63			0.06		2.25			0.11
		(2.68)			(0.06)		(1.12)			(0.11)
Sand shiner		0.08					0.07			
		(0.08)					(0.07)			
Mimic shiner		0.95			1.02		5.03			3.10
		(0.75)			(0.62)		(1.86)			(2.78)
Pugnose minnow		0.17								
		(0.12)								
Bullhead minnow		10.40			1.65		11.15			1.74
		(3.41)			(1.02)		(3.86)			(1.74)
River carpsucker		0.32					0.36			0.38
		(0.20)					(0.25)			(0.26)
Quillback		6.60			9.03	0.28	3.97			10.40
		(2.45)			(3.06)	(0.10)	(1.55)			(4.11)
Highfin carpsucker		0.27					0.07			0.36
		(0.20)					(0.07)			(0.23)
Blue sucker						0.10	0.07			
						(0.10)	(0.07)			
Smallmouth buffalo		12.64			0.86	0.25	0.99			9.01
		(4.75)			(0.66)	(0.11)	(0.44)			(6.06)
Bigmouth buffalo		0.18					0.08			0.13
		(0.09)					(0.08)			(0.13)
Spotted sucker		3.48								1.33
		(0.77)								(0.64)
Silver redhorse		5.14			3.74	3.70	7.55			12.23
		(1.24)			(1.53)	(0.87)	(1.57)			(3.07)
River redhorse		0.07			0.25	2.15				0.63
		(0.07)			(0.25)	(0.50)				(0.63)
Golden redhorse		1.66			0.98	0.56	1.39			4.35
		(0.49)			(0.38)	(0.21)	(1.07)			(0.89)

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Table 2.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by night electrofishing in Pool 8 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Shorthead redhorse		3.78			7.76	11.17	7.32			7.55
		(1.79)			(1.63)	(2.53)	(1.11)			(1.68)
Channel catfish		0.26			0.31	0.47	0.59			4.35
		(0.15)			(0.25)	(0.18)	(0.23)			(2.58)
Flathead catfish		0.26			0.25	0.05	0.07			
		(0.11)			(0.19)	(0.04)	(0.07)			
Northern pike		0.59			0.09	0.03	0.22			0.78
		(0.27)			(0.09)	(0.03)	(0.12)			(0.64)
Trout-perch		0.14			0.08		0.15			
		(0.09)			(0.08)		(0.10)			
Brook silverside		2.11					0.18			0.33
		(0.76)					(0.18)			(0.33)
White bass		45.29			31.61	0.64	27.00			83.10
		(12.03)			(9.82)	(0.26)	(7.28)			(27.33)
Rock bass		0.44			0.23		1.43			0.75
		(0.15)			(0.12)		(0.44)			(0.61)
Green sunfish		0.12					0.07			0.63
		(0.08)					(0.07)			(0.36)
Pumpkinseed		0.06								
		(0.06)								
Orangespotted sunfish		1.44								
		(0.47)								
Bluegill		36.86			0.52		3.26			5.86
		(8.58)			(0.37)		(0.98)			(2.72)
Smallmouth bass		1.93			1.19	3.16	1.64			7.25
		(0.69)			(0.55)	(1.04)	(0.40)			(3.36)
Largemouth bass		8.62			0.07	0.06				2.04
		(3.12)			(0.07)	(0.04)				(0.98)
White crappie		0.08								
		(0.08)								
Black crappie		4.77					1.02			0.23
		(1.02)					(0.48)			(0.15)
Western sand darter							0.09			
							(0.09)			
Mud darter		0.40				0.13	0.08			
		(0.27)				(0.13)	(0.08)			
Johnny darter		2.61			0.08		0.15			0.33
		(1.13)			(0.08)		(0.10)			(0.33)
Yellow perch		4.16					0.22			2.61
		(0.99)					(0.16)			(2.02)
Logperch		1.76			0.81	0.27	0.81			2.69
		(0.39)			(0.59)	(0.10)	(0.34)			(1.33)
Slenderhead darter						0.02				
						(0.02)				
River darter		0.08			0.06		0.14			1.32
		(0.08)			(0.06)		(0.14)			(1.18)
Sauger		13.19			7.86	0.67	9.44			132.25
		(4.11)			(2.60)	(0.23)	(2.11)			(38.57)
Walleye		7.99			3.31	2.20	3.92			44.77
		(2.37)			(0.46)	(0.78)	(0.50)			(11.61)
Freshwater drum		1.74			1.71	1.65	2.60			20.96
		(0.49)			(0.63)	(0.42)	(1.81)			(11.74)

Strata: BWCS - Backwater, contiguous, shoreline
BWCO - Backwater, contiguous, offshore
IMPS - Impounded, shoreline
IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 2.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by fyke netting in Pool 8 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Chestnut lamprey		0.04								
		(0.04)								
Longnose gar		0.38								
		(0.15)								
Shortnose gar		1.09		3.12						
		(0.43)		(1.47)						
Bowfin		2.58		0.17						0.17
		(1.32)		(0.17)						(0.17)
Mooneye				0.16						
				(0.16)						
Gizzard shad		0.34		0.32						0.67
		(0.13)		(0.20)						(0.33)
Spotfin shiner		0.04								
		(0.04)								
Common carp		1.95		2.35						
		(0.56)		(0.96)						
Golden shiner		0.30								0.17
		(0.14)								(0.17)
River carpsucker		0.30								
		(0.18)								
White sucker		0.04								
		(0.04)								
Smallmouth buffalo		0.59		0.16						2.64
		(0.24)		(0.16)						(2.64)
Spotted sucker		1.32								0.33
		(0.40)								(0.21)
Silver redhorse		3.42		2.80						1.50
		(0.96)		(1.34)						(0.67)
Golden redhorse		0.13								
		(0.07)								
Shorthead redhorse		0.97		1.83						0.34
		(0.30)		(0.70)						(0.34)
Black bullhead		0.24								2.50
		(0.12)								(2.13)
Yellow bullhead		0.28								
		(0.21)								
Brown bullhead		0.04								
		(0.04)								
Channel catfish		0.08		0.84						
		(0.06)		(0.84)						
Flathead catfish		0.25		0.16						
		(0.19)		(0.16)						
Northern pike		1.52								1.67
		(0.31)								(1.12)
White bass		79.78		17.50						84.64
		(41.17)		(9.23)						(68.90)
Yellow bass		0.08								
		(0.06)								
Rock bass		0.08								0.34
		(0.06)								(0.21)
Green sunfish		0.17								
		(0.10)								
Pumpkinseed		0.34								
		(0.13)								
Warmouth		0.04								
		(0.04)								
Orangespotted sunfish		0.34								
		(0.14)								
Bluegill		51.56		1.35						6.53
		(15.95)		(1.35)						(3.60)

Strata: BWCS - Backwater, contiguous, shoreline
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MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 2.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by fyke netting in Pool 8 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Green x warmouth sunfish		0.04								
		(0.04)								
Largemouth bass		0.41								0.17
		(0.20)								(0.17)
White crappie		4.37		0.16						1.68
		(1.87)		(0.16)						(0.93)
Black crappie		67.64		3.38						5.18
		(15.35)		(2.99)						(1.50)
Yellow perch		1.53								1.66
		(0.39)								(0.92)
Sauger				0.49						1.17
				(0.33)						(0.66)
Walleye		0.37								0.66
		(0.22)								(0.66)
Freshwater drum		0.51		0.83						1.67
		(0.22)		(0.31)						(0.33)

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MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 2.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by tandem fyke netting in Pool 8 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Gizzard shad			0.55							
			(0.30)							
Common carp			0.24							
			(0.11)							
Bigmouth buffalo			0.08							
			(0.08)							
Silver redhorse			0.94							
			(0.60)							
Shorthead redhorse			0.74							
			(0.28)							
Channel catfish			0.17							
			(0.17)							
White bass			7.47							
			(4.09)							
Sauger			0.08							
			(0.08)							
Freshwater drum			0.89							
			(0.23)							

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IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 2.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by mini fyke netting in Pool 8 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Longnose gar		0.09		0.16						
		(0.09)		(0.16)						
Shortnose gar				0.16						
				(0.16)						
Bowfin		0.08								
		(0.08)								
Gizzard shad		1.52								25.41
		(0.81)								(25.02)
Spotfin shiner		0.17				52.06				6.51
		(0.17)				(21.37)				(5.23)
Common carp		0.40		0.51		0.05				0.17
		(0.22)		(0.35)		(0.05)				(0.17)
Golden shiner		0.99								
		(0.99)								
Emerald shiner		0.17		0.47		0.16				0.17
		(0.12)		(0.47)		(0.09)				(0.17)
River shiner						0.11				
						(0.11)				
Spottail shiner		0.35		0.17		0.21				3.50
		(0.35)		(0.17)		(0.21)				(2.39)
Weed shiner		0.08								
		(0.08)								
Mimic shiner						0.11				1.17
						(0.07)				(0.98)
Pugnose minnow		34.71		0.47						
		(24.09)		(0.32)						
Bullhead minnow		2.00		0.17		7.76				2.00
		(0.64)		(0.17)		(4.60)				(1.09)
Quillback				0.51						0.17
				(0.35)						(0.17)
Smallmouth buffalo		0.26								0.17
		(0.26)								(0.17)
Spotted sucker		0.77								
		(0.56)								
Silver redhorse		0.51		0.34		0.06				
		(0.26)		(0.34)		(0.06)				
Shorthead redhorse				0.64		0.32				0.33
				(0.32)		(0.18)				(0.21)
Black bullhead										0.17
										(0.17)
Yellow bullhead		0.17								0.17
		(0.17)								(0.17)
Brown bullhead		0.08								
		(0.08)								
Tadpole madtom		0.17								
		(0.12)								
Northern pike		0.09								
		(0.09)								
White bass		3.46		3.66		0.16				16.08
		(1.06)		(1.56)		(0.12)				(7.77)
Green sunfish				0.17						
				(0.17)						
Pumpkinseed		0.08								
		(0.08)								
Warmouth		0.16								
		(0.16)								
Orangespotted sunfish		0.08								0.17
		(0.08)								(0.17)
Bluegill		209.64		0.63		0.28				2.84
		(171.28)		(0.63)		(0.28)				(1.70)

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SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 2.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by mini fyke netting in Pool 8 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Pumpkinseed x bluegill		0.32 (0.25)								
Smallmouth bass						0.17 (0.12)				
Largemouth bass		0.08 (0.08)								0.17 (0.17)
White crappie		2.36 (1.29)								
Black crappie		3.30 (1.28)				0.11 (0.07)				1.51 (1.16)
Mud darter		0.34 (0.14)								0.17 (0.17)
Johnny darter		0.17 (0.11)				0.06 (0.06)				0.67 (0.34)
Yellow perch		0.26 (0.26)								
Logperch		0.93 (0.62)				0.27 (0.13)				5.15 (2.49)
Slenderhead darter						0.06 (0.06)				0.17 (0.17)
River darter		0.09 (0.09)		0.17 (0.17)		0.05 (0.05)				4.35 (2.80)
Sauger		0.08 (0.08)								0.67 (0.34)
Walleye						0.06 (0.06)				
Freshwater drum		0.16 (0.11)		0.17 (0.17)		0.23 (0.13)				0.66 (0.66)

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Table 2.3.6. Mean catch-per-unit-effort and (standard error) for fishes collected by tandem mini fyke netting in Pool 8 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Common carp			0.17							
			(0.11)							
Quillback			0.17							
			(0.11)							
Shorthead redhorse			0.17							
			(0.11)							
White bass			3.91							
			(2.06)							
Bluegill			0.08							
			(0.08)							
Johnny darter			0.08							
			(0.08)							
Logperch			0.34							
			(0.25)							
Slenderhead darter			0.08							
			(0.08)							
Freshwater drum			11.68							
			(7.70)							

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IMPO - Impounded, offshore
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MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 2.3.7. Mean catch-per-unit-effort and (standard error) for fishes collected by tandem hoop netting in Pool 8 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Silver lamprey							0.04 (0.04)			
Shortnose gar						0.03 (0.03)				
Common carp					0.70 (0.52)	0.26 (0.14)	1.33 (0.76)			1.50 (1.30)
Silver chub					0.13 (0.07)					
Quillback										0.08 (0.08)
Smallmouth buffalo					2.80 (1.76)	0.14 (0.10)	3.12 (1.07)			0.74 (0.65)
Silver redhorse					0.12 (0.12)	0.17 (0.12)	0.50 (0.36)			1.25 (0.76)
Golden redhorse					0.04 (0.04)		0.04 (0.04)			
Shorthead redhorse					1.98 (0.56)	0.45 (0.15)	2.81 (1.77)			2.15 (1.60)
Channel catfish					1.57 (0.48)	0.14 (0.07)	1.63 (0.31)			10.65 (10.05)
Flathead catfish					0.08 (0.05)	0.06 (0.04)	0.13 (0.07)			0.58 (0.49)
Northern pike						0.03 (0.03)				
White bass						0.47 (0.28)	0.08 (0.08)			1.90 (0.76)
Rock bass						0.03 (0.03)				
Bluegill						0.11 (0.09)				
Smallmouth bass						0.06 (0.04)				
White crappie										0.08 (0.08)
Black crappie						0.17 (0.08)	0.04 (0.04)			2.07 (0.79)
Black x white crappie										0.25 (0.25)
Sauger					0.08 (0.06)					0.08 (0.08)
Walleye						0.03 (0.03)	0.04 (0.04)			0.17 (0.10)
Freshwater drum					0.16 (0.07)	0.14 (0.11)	4.54 (2.31)			3.56 (1.50)

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IMPO - Impounded, offshore
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MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 2.3.8. Mean catch-per-unit-effort and (standard error) for fishes collected by seining in Pool 8 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Longnose gar							0.04			
							(0.04)			
Mooneye		0.08								
		(0.08)								
Gizzard shad		46.50			5.00		2.21			
		(46.05)			(3.32)		(1.71)			
Spotfin shiner		9.50			3.42		20.58			
		(5.19)			(1.85)		(8.05)			
Common carp		0.08			0.33		1.21			
		(0.08)			(0.14)		(0.56)			
Mississippi silvery minnow					0.08		2.21			
					(0.06)		(1.38)			
Golden shiner							0.04			
							(0.04)			
Pallid shiner		0.08								
		(0.08)								
Emerald shiner		3.00			23.25		302.71			
		(2.56)			(11.02)		(144.10)			
River shiner		2.08			7.42		38.50			
		(1.16)			(3.42)		(18.52)			
Spottail shiner		4.50			0.67		5.46			
		(1.75)			(0.33)		(1.73)			
Sand shiner					0.17		0.38			
					(0.17)		(0.21)			
Weed shiner					0.04					
					(0.04)					
Mimic shiner		1.92			1.83		17.92			
		(1.57)			(1.12)		(8.51)			
Pugnose minnow		2.17					0.08			
		(0.94)					(0.06)			
Bluntnose minnow							0.29			
							(0.25)			
Bullhead minnow		30.00			1.08		9.25			
		(15.64)			(0.50)		(3.07)			
Quillback		5.42			9.58		36.29			
		(3.23)			(6.60)		(17.44)			
Blue sucker					0.42		0.46			
					(0.33)		(0.23)			
Smallmouth buffalo		2.92					11.00			
		(0.99)					(5.82)			
Spotted sucker		0.08								
		(0.08)								
Silver redhorse		0.08			2.63		0.54			
		(0.08)			(1.79)		(0.31)			
Golden redhorse		0.08								
		(0.08)								
Shorthead redhorse		0.17			1.67		1.13			
		(0.11)			(0.96)		(0.55)			
Trout-perch							0.08			
							(0.06)			
Brook silverside		1.08			0.04		1.00			
		(0.83)			(0.04)		(0.63)			
Brook stickleback					0.08					
					(0.06)					
White bass		11.25			6.38		5.25			
		(9.34)			(3.55)		(2.70)			
Rock bass		0.08					0.04			
		(0.08)					(0.04)			
Green sunfish					0.04					
					(0.04)					

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CTR - Main channel trough
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TWZ - Tailwater

Table 2.3.8. Mean catch-per-unit-effort and (standard error) for fishes collected by seining in Pool 8 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Pumpkinseed							0.04			
							(0.04)			
Orangespotted sunfish		0.25								
		(0.25)								
Bluegill		3.00			0.13		0.42			
		(1.27)			(0.09)		(0.16)			
Smallmouth bass		0.58			0.25		1.67			
		(0.40)			(0.14)		(0.87)			
Largemouth bass		0.67			0.42		0.42			
		(0.40)			(0.23)		(0.19)			
Black crappie							0.25			
							(0.17)			
Western sand darter					2.88		1.67			
					(1.24)		(0.80)			
Mud darter		1.83			0.08		1.96			
		(1.01)			(0.06)		(1.33)			
Johnny darter		17.67			0.13		5.75			
		(10.87)			(0.07)		(2.52)			
Yellow perch		2.42			0.04		1.21			
		(1.18)			(0.04)		(0.57)			
Logperch		2.08			0.42		4.92			
		(0.97)			(0.19)		(2.64)			
River darter		0.08			0.08		1.38			
		(0.08)			(0.06)		(0.63)			
Sauger		0.08			0.04		0.08			
		(0.08)			(0.04)		(0.06)			
Walleye					0.33		0.04			
					(0.18)		(0.04)			
Freshwater drum		0.08			0.25		0.08			
		(0.08)			(0.21)		(0.08)			

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IMPO - Impounded, offshore
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SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 2.3.9. Mean catch-per-unit-effort and (standard error) for fishes collected by bottom trawling in Pool 8 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Shovelnose sturgeon								0.31		1.50
								(0.17)		(0.44)
Longnose gar					0.13					
					(0.13)					
Mooneye					0.46			0.17		
					(0.20)			(0.07)		
Gizzard shad					0.13					0.25
					(0.09)					(0.18)
Spotfin shiner					0.04					
					(0.04)					
Common carp					0.17			0.03		0.08
					(0.10)			(0.03)		(0.08)
Speckled chub								0.03		0.17
								(0.03)		(0.17)
Silver chub					0.33			0.25		0.67
					(0.12)			(0.09)		(0.58)
Mimic shiner					0.04					
					(0.04)					
Quillback										0.08
										(0.08)
Blue sucker					0.04					
					(0.04)					
Silver redhorse					0.17			0.06		0.42
					(0.10)			(0.04)		(0.23)
Shorthead redhorse					0.13			0.08		0.75
					(0.07)			(0.06)		(0.51)
Channel catfish					0.17			0.33		13.67
					(0.08)			(0.11)		(7.66)
Flathead catfish										0.08
										(0.08)
White bass					2.92			0.17		0.33
					(1.52)			(0.12)		(0.19)
Black crappie					0.08			0.06		
					(0.06)			(0.04)		
Crystal darter										0.17
										(0.11)
Logperch					0.17					
					(0.17)					
Slenderhead darter					0.04					
					(0.04)					
River darter								0.06		
								(0.06)		
Sauger					0.13			0.08		0.50
					(0.07)			(0.05)		(0.36)
Walleye					0.08					0.33
					(0.06)					(0.33)
Freshwater drum					6.00			23.11		23.75
					(2.52)			(9.46)		(11.86)

Strata: BWCS - Backwater, contiguous, shoreline
BWCO - Backwater, contiguous, offshore
IMPS - Impounded, shoreline
IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

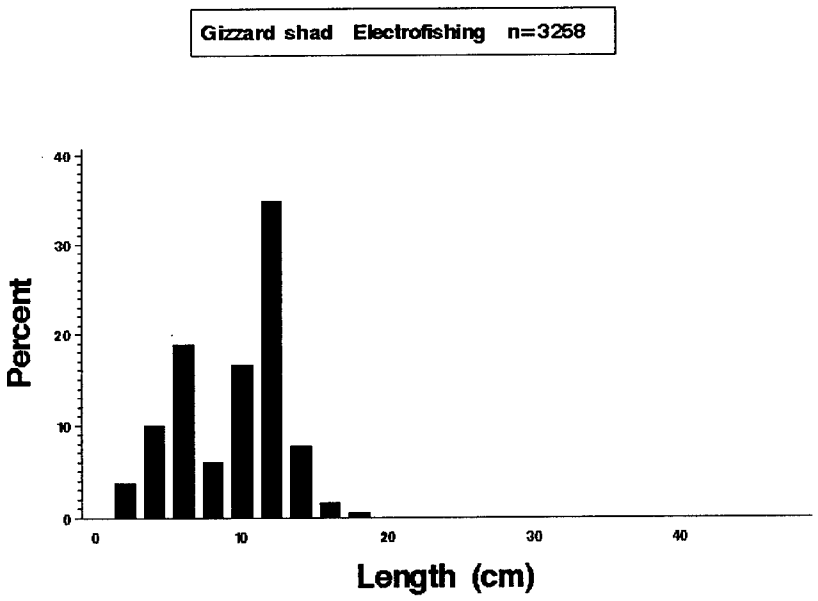

Figure 2.2. Length distributions (*length*) as a percentage of catch (*percent*) for gizzard shad (*Dorosoma cepedianum*) collected by electrofishing in Upper Mississippi River Pool 8 during 1992.

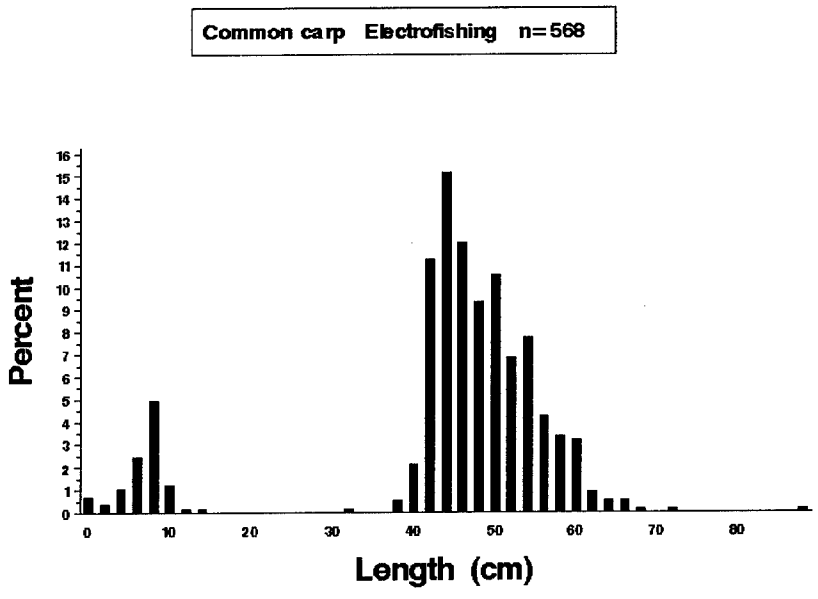

Figure 2.3. Length distributions (*length*) as a percentage of catch (*percent*) for common carp (*Cyprinus carpio*) collected by electrofishing in Upper Mississippi River Pool 8 during 1992.

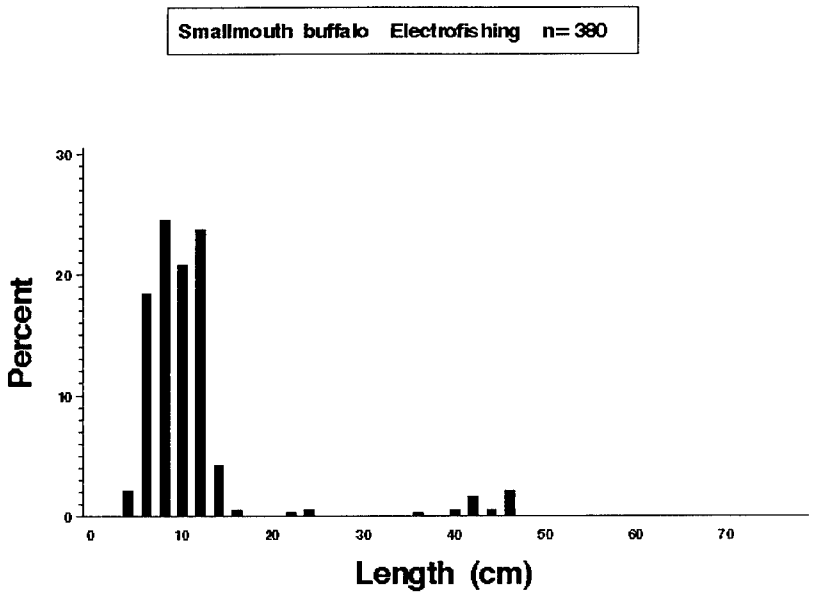

Figure 2.4. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by electrofishing in Upper Mississippi River Pool 8 during 1992.

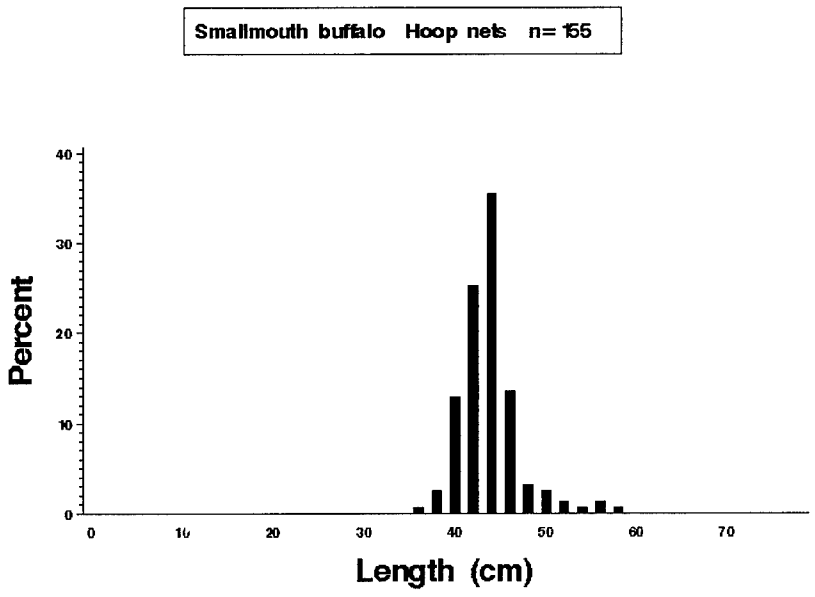

Figure 2.5. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by large and small hoop netting in Upper Mississippi River Pool 8 during 1992.

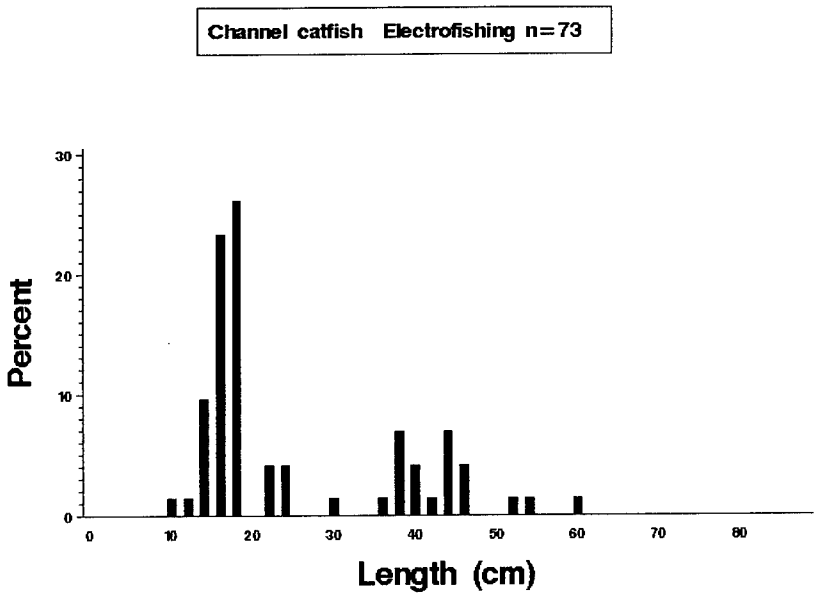

Figure 2.6. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by electrofishing in Upper Mississippi River Pool 8 during 1992.

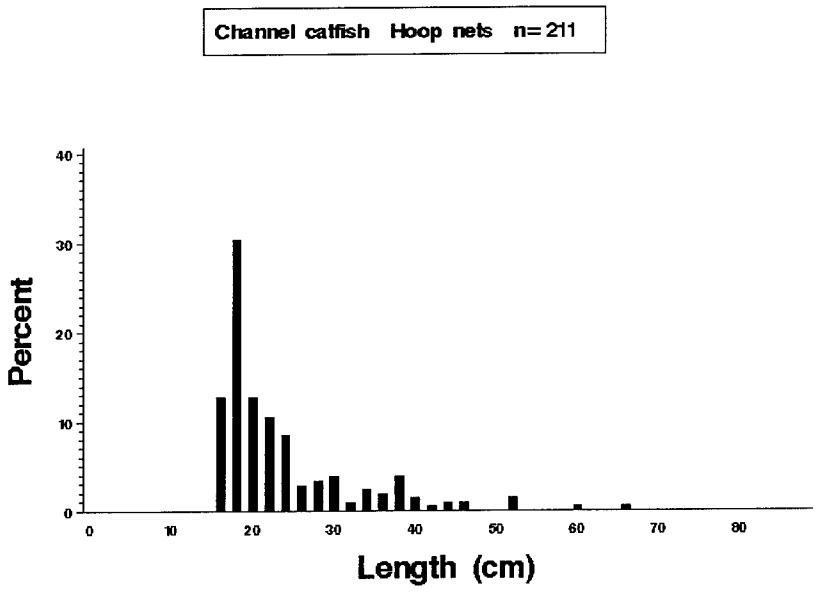

Figure 2.7. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by large and small hoop netting in Upper Mississippi River Pool 8 during 1992.

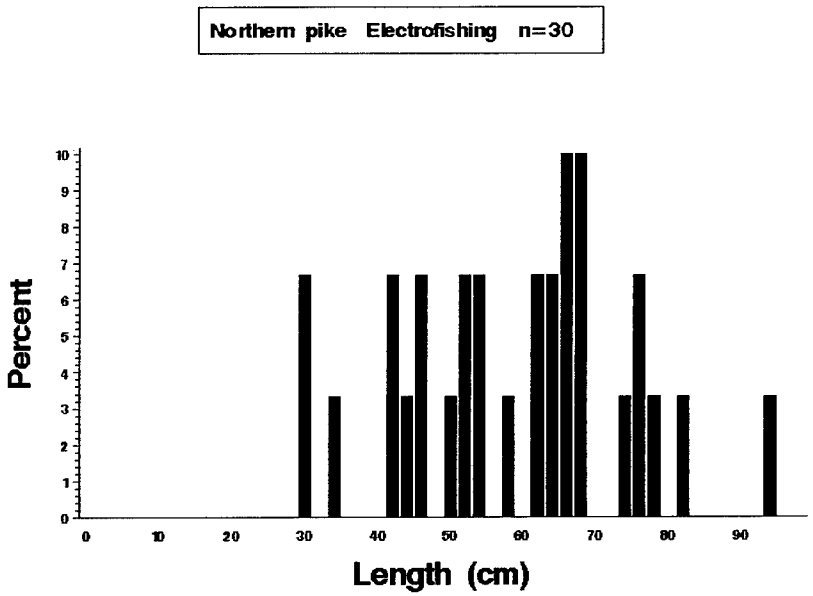

Figure 2.8. Length distributions (*length*) as a percentage of catch (*percent*) for northern pike (*Esox lucius*) collected by electrofishing in Upper Mississippi River Pool 8 during 1992.

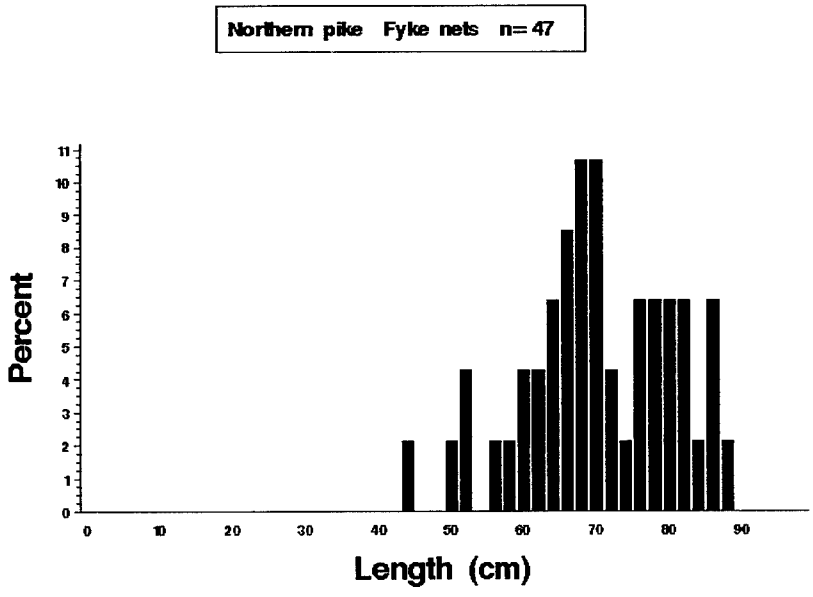

Figure 2.9. Length distributions (*length*) as a percentage of catch (*percent*) for northern pike (*Esox lucius*) collected by fyke netting in Upper Mississippi River Pool 8 during 1992.

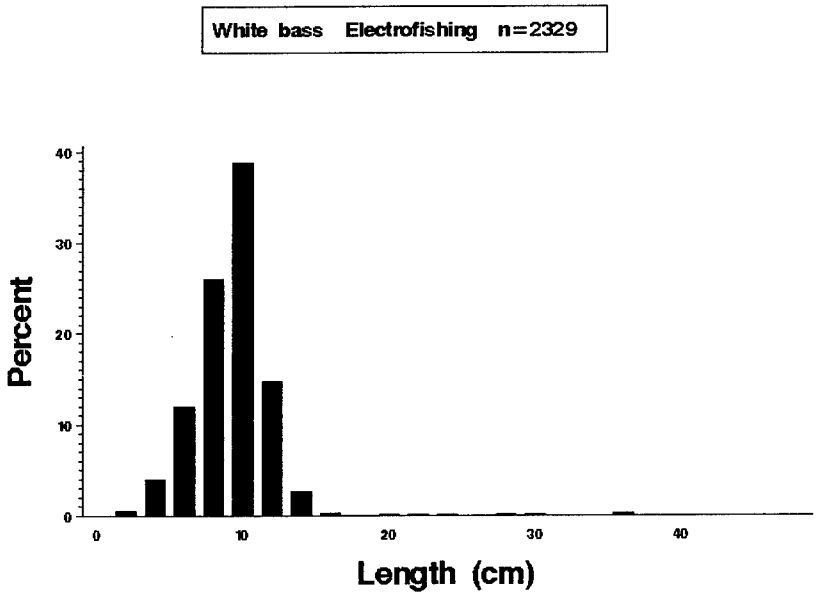

Figure 2.10. Length distributions (*length*) as a percentage of catch (*percent*) for white bass (*Morone chrysops*) collected by electrofishing in Upper Mississippi River Pool 8 during 1992.

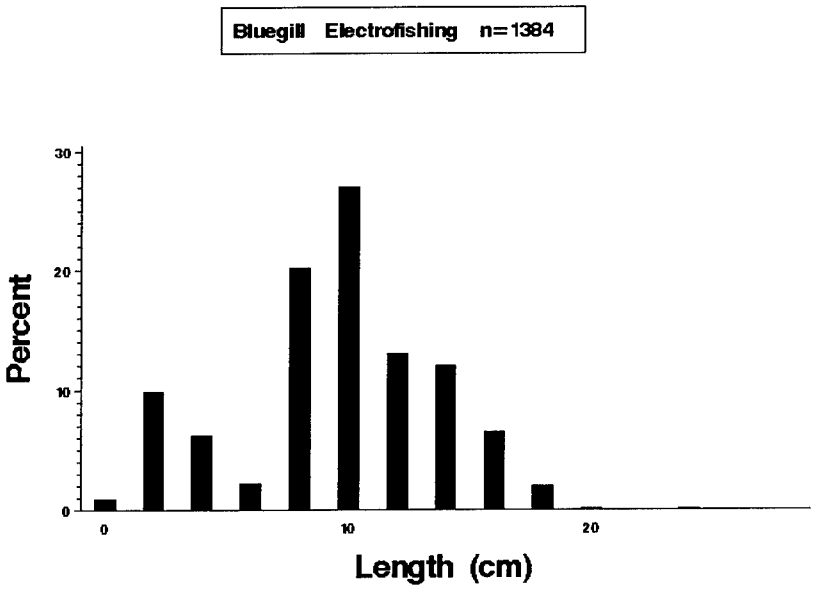

Figure 2.11. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by electrofishing in Upper Mississippi River Pool 8 during 1992.

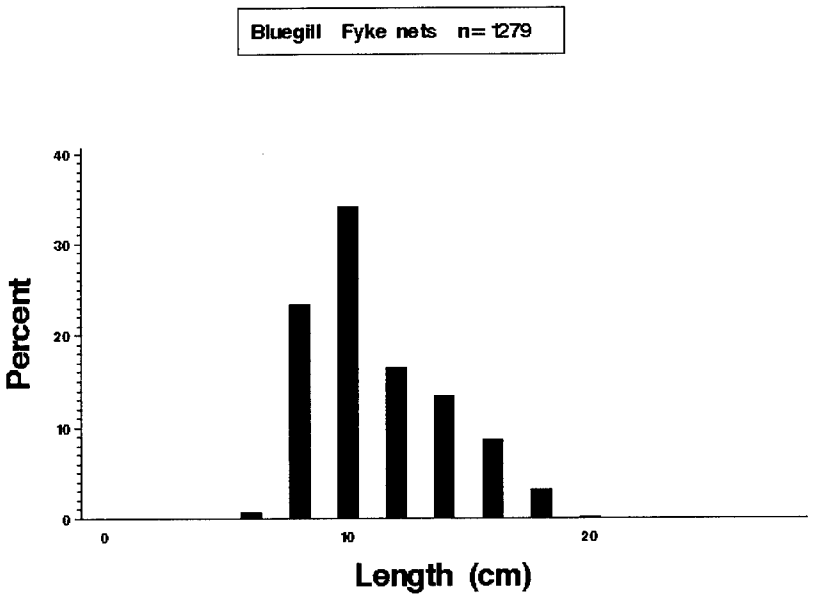

Figure 2.12. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by fyke netting in Upper Mississippi River Pool 8 during 1992.

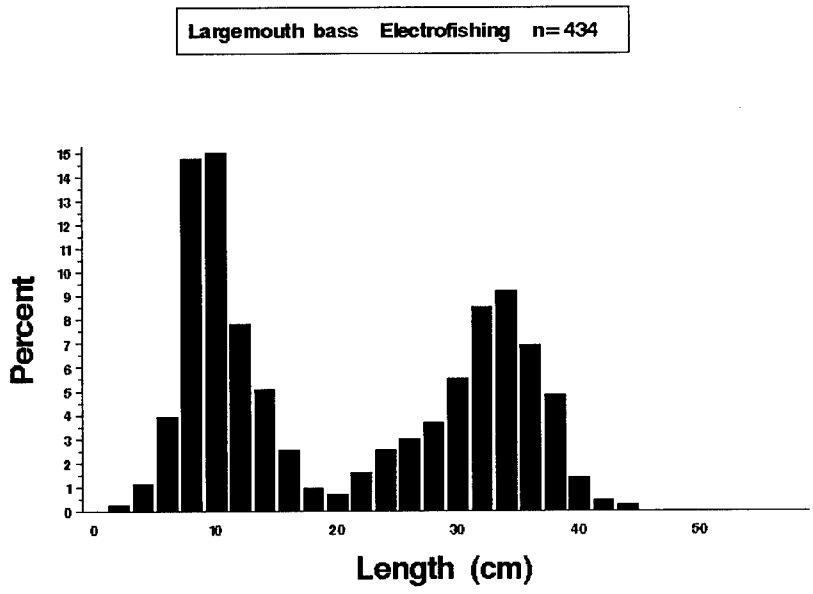

Figure 2.13. Length distributions (*length*) as a percentage of catch (*percent*) for largemouth bass (*Micropterus salmoides*) collected by electrofishing in Upper Mississippi River Pool 8 during 1992.

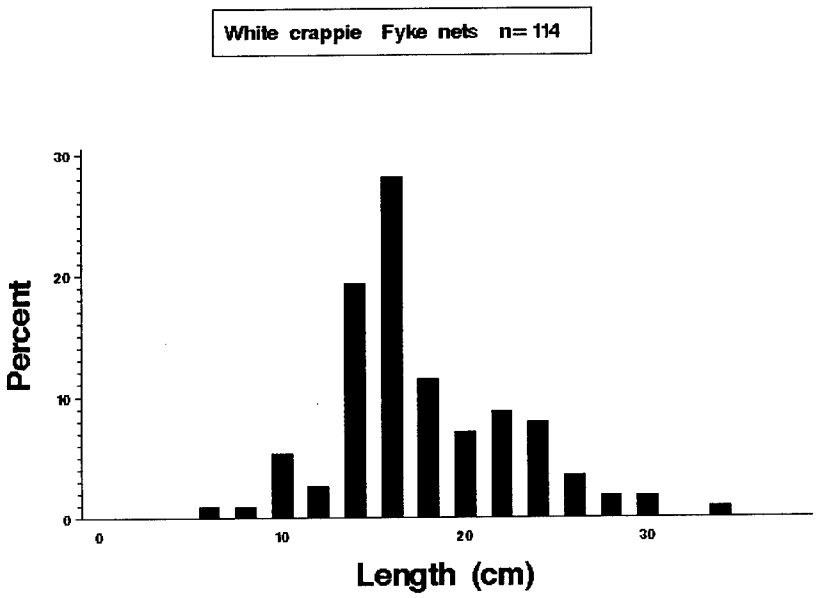

Figure 2.14. Length distributions (*length*) as a percentage of catch (*percent*) for white crappie (*Pomoxis annularus*) collected by electrofishing in Upper Mississippi River Pool 8 during 1992.

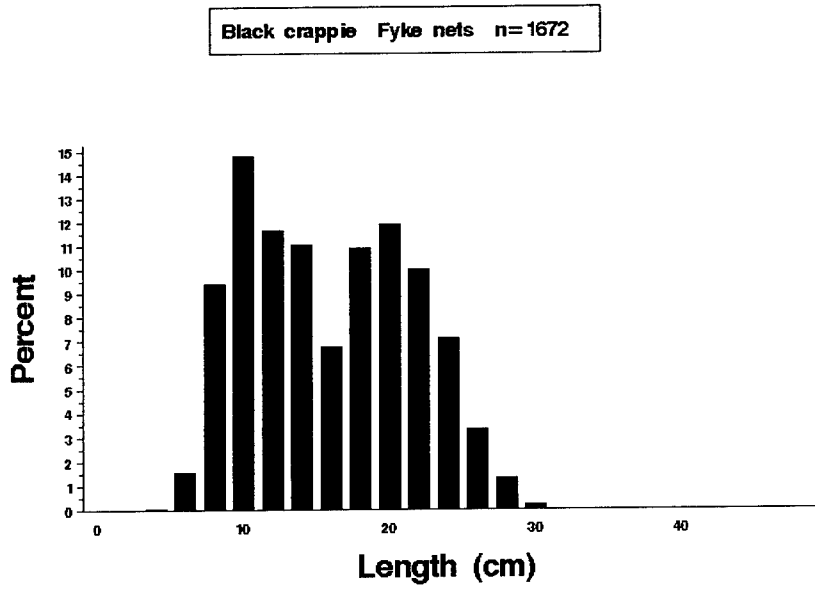

Figure 2.15. Length distributions (*length*) as a percentage of catch (*percent*) for black crappie (*Pomoxis nigromaculatus*) collected by electrofishing in Upper Mississippi River Pool 8 during 1992.

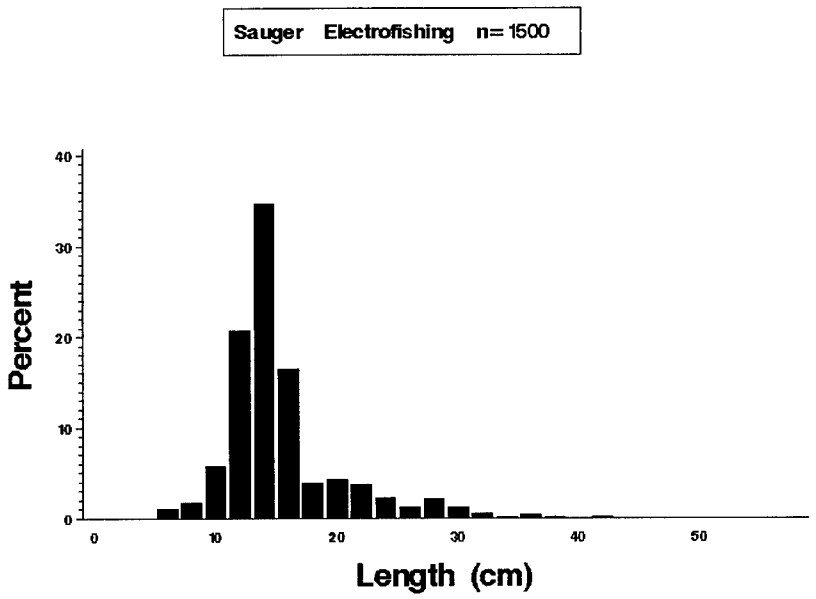

Figure 2.16. Length distributions (*length*) as a percentage of catch (*percent*) for sauger (*Stizostedion canadense*) collected by electrofishing in Upper Mississippi River Pool 8 during 1992.

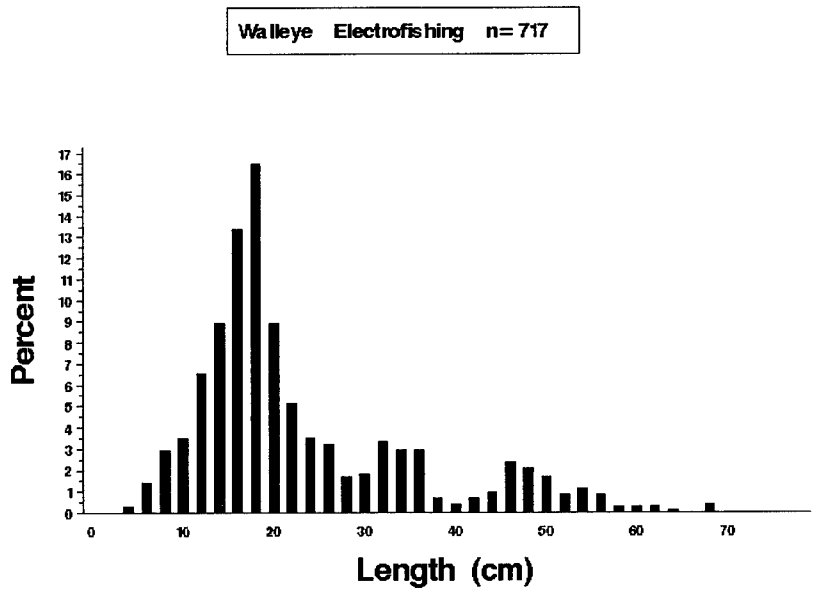

Figure 2.17. Length distributions (*length*) as a percentage of catch (*percent*) for walleye (*Stizostedion vitreum*) collected by electrofishing in Upper Mississippi River Pool 8 during 1992.

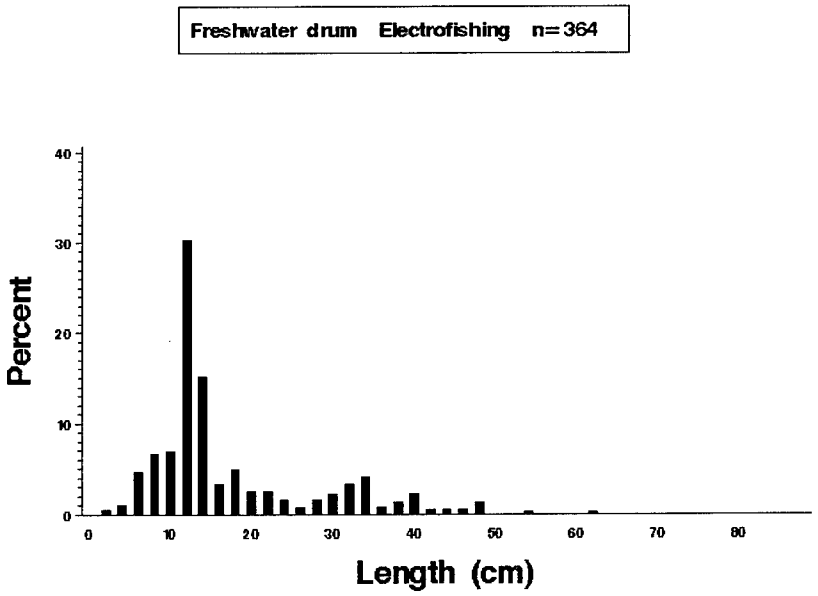

Figure 2.18. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by electrofishing in Upper Mississippi River Pool 8 during 1992.

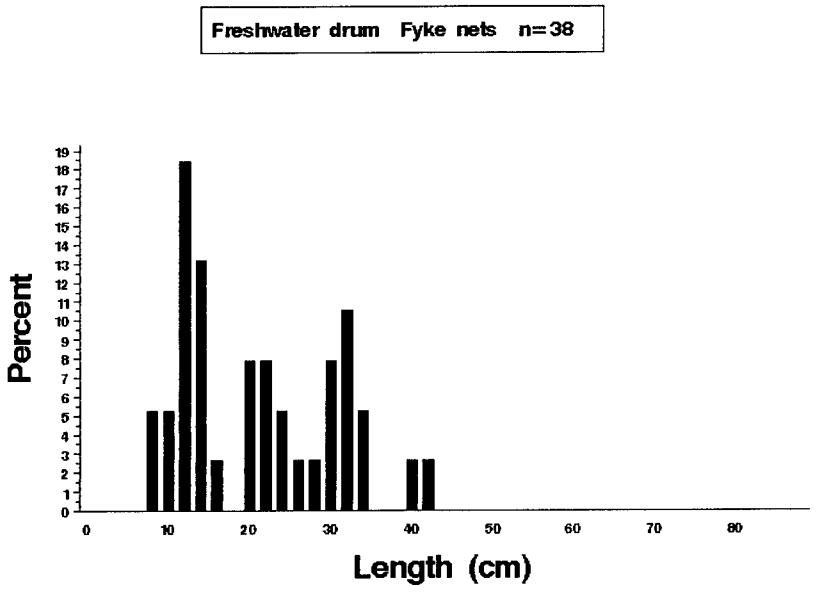

Figure 2.19. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by fyke netting in Upper Mississippi River Pool 8 during 1992.

Chapter 3. Pool 13, Upper Mississippi River

by

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Hydrograph

Water levels were extremely variable throughout the sampling period at the Lock and Dam 12 tailwater gage (Figure 3.1). During sampling, we encountered the highest water levels in the first week of the third period (September 15–22), and the lowest water levels in the last 2 weeks of the second period (August 24–September 14). Because of high water, we did not complete 2-day electrofishing MCBW samples during the first period. The U.S. Army Corps of Engineers discharge data were obtained from the Environmental Management Technical Center (Wlosinski et al. 1995).

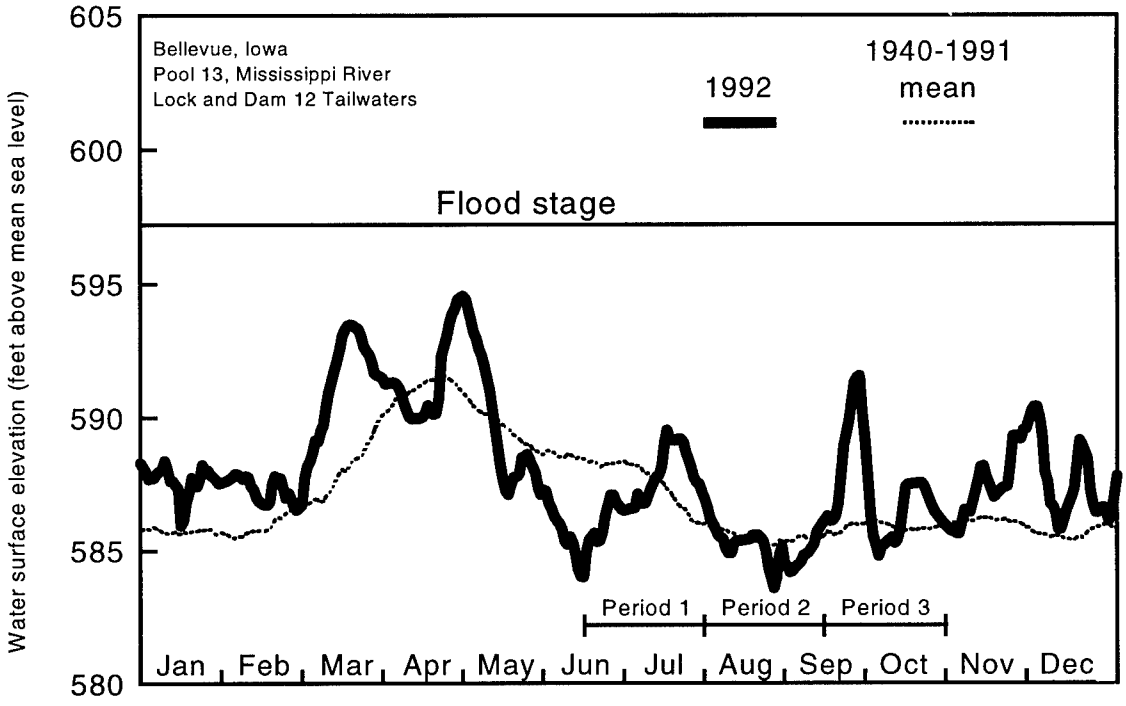

Figure 3.1. Daily water surface elevation from Lock and Dam 12 for Pool 13, Upper Mississippi River, during 1992 and mean elevation since 1940. The U.S. Army Corps of Engineers discharge data were obtained from the Environmental Management Technical Center (Wlosinski et al. 1995).

Summary of Sampling Effort

We sampled the fish population in Pool 13 in 1992 using nine types of gear that were deployed among eight strata types. A total of 378 samples were allocated during the three periods and 376 samples were completed. Sampling effort was nearly uniform among all three periods. We completed 124 samples in the first period, 126 samples in the second period, and 126 samples in the third period (Table 3.1).

Total Catch by Gear

We collected 33,217 fish representing 64 species and one hybrid. The top five species collected with all gears combined were the emerald shiner (4,594), white bass (3,562), bluegill (3,547), common carp (3,056), and freshwater drum (2,671).

We collected 6,482 fish (51 species) by day electrofishing, 8,545 fish (49 species) by night electrofishing, 5,363 fish (34 species, including a green sunfish × bluegill) by fyke netting, 196 fish (20 species) by tandem fyke netting, 1,423 fish (41 species, including a green sunfish × bluegill) by mini fyke netting, 30 fish (12 species) by tandem mini fyke netting, 7,441 fish (42 species, including a green sunfish × bluegill) by seining, 3,192 fish (23 species) by tandem hoop netting, and 545 fish (20 species) by trawling (Table 3.2).

We collected 1 chestnut lamprey and 3 western sand darters in 1992, which are listed as a threatened species in Iowa. We also collected 15 pugnose minnows—this species is listed as being of special concern in Iowa. Other notable species we collected were 1 American eel, 1 southern redbelly dace, 3 fathead minnows, 5 creek chubs, 34 quillback, 1 white sucker, 3 blue suckers, 5 black buffalo, 2 silver redhorse, 2 stonecat, and 21 smallmouth bass. These species are listed as uncommon, rare, or tributary strays in Pool 13 by Pitlo et al. (1995) and are infrequently encountered in Long Term Resource Monitoring Program sampling.

Fixed Sampling, Mean *C/f* by Gear and Stratum

Mean *C/f* of dominant fish species for fixed sampling by gear type and stratum is listed in Tables 3.3.1 to 3.3.9.

Day Electrofishing

Day electrofishing *C/f* (fish/15 min) was highest for emerald shiner (42.21) in the BWCS stratum, emerald shiner (19.50) in the IMPS stratum, gizzard shad (8.58) in the MCBU stratum, shorthead redhorse (7.38) in the MCBW stratum, and emerald shiner (51.58) in the SCB stratum (Table 3.3.1).

Night Electrofishing

Night electrofishing *C/f* (fish/15 min) was highest for bluegill (54.17) in the BWCS stratum, walleye (23.33) in the MPS stratum, freshwater drum (23.00) in the MCBU stratum, bluegill (22.67) in the SCB stratum, and white bass (123.67) in the TWZ stratum (Table 3.3.2).

Fyke Net

Fyke netting *C/f* (fish per net-day) was highest for black crappie (44.91) in the BWCS stratum, bluegill (27.00) in the IMPS stratum, and white bass (179.63) in the TWZ stratum (Table 3.3.3).

Tandem Fyke Net

Tandem fyke netting *C/f* (fish per net-day) was highest for shorthead redhorse (4.66) in the IMPO stratum (Table 3.3.4).

Mini Fyke Net

Mini fyke netting *C/f* (fish per net-day) was highest for emerald shiner (6.68) in the BWCS stratum, emerald shiner (50.40) in the IMPS stratum, channel shiner (10.76) in the MCBW stratum, and white bass (16.08) in the TWZ stratum (Table 3.3.5).

Tandem Mini Fyke Net

Tandem mini fyke netting *C/f* (fish per net-day) was highest for white bass (0.74) in the IMPS stratum (Table 3.3.6).

Tandem Hoop Net

Tandem hoop netting *C/f* (fish per net-day) was highest for channel catfish (4.71) in the MCBU stratum, smallmouth buffalo (1.92) in the MCBW stratum, smallmouth buffalo (4.15) in the SCB stratum, and channel catfish (158.32) in the TWZ stratum (Table 3.3.7).

Seine

Seining *C/f* (fish per haul) was highest for white bass (22.17) in the BWCS stratum, emerald shiner (83.83) in the MCBU stratum, and emerald shiner (35.17) in the SCB stratum (Table 3.3.8).

Trawl

Trawling *C/f* (fish per haul) was highest for freshwater drum (6.21) in the MCBU stratum, channel catfish (2.61) in the CTR stratum, and channel catfish (7.17) in the TWZ stratum (Table 3.3.9).

Length Distributions of Selected Species

Length distributions (expressed as a percentage of total catch for a species by various gears) for gizzard shad, common carp, smallmouth buffalo, channel catfish, northern pike, white bass, bluegill, largemouth bass, white crappie, black crappie, sauger, walleye, and freshwater drum are illustrated in Figures 3.2 to 3.18. Because data within a single sampling season are taken over a long time and size ranges for certain fish can overlap (e.g., a 6-cm-long bluegill collected early in period 1 is not of the same cohort as a 6-cm-long bluegill collected late in period 3), interpretations in the length distributions should be made cautiously. Length distributions from small samples ($n < 100$) may be included but are not statistically meaningful (Anderson and Neumann 1996).

Gizzard Shad

We collected 1,072 gizzard shad by day and night electrofishing, with lengths ranging from 2.0 to 42.1 cm (Figure 3.2). Mean length was 14.8 cm, and peak distribution occurred at 4 cm.

Common Carp

We collected 664 common carp by day and night electrofishing, with lengths ranging from 4.5 to 85.0 cm (Figure 3.3). Mean length was 44.3 cm, and peak distribution occurred at 44 cm, with the majority of fish between 42 and 52 cm.

Smallmouth Buffalo

We collected 112 smallmouth buffalo by day and night electrofishing, with lengths ranging from 4.3 to 43.0 cm (Figure 3.4). Mean length was 26.5 cm, and peak distribution occurred at 10 cm. We also collected 351 smallmouth buffalo by tandem large and small hoop netting, with lengths ranging from 22.0 to 52.6 cm (Figure 3.5). Mean length was 38.2 cm, and peak distribution occurred at 40 cm.

Channel Catfish

We collected 97 channel catfish by day and night electrofishing, with lengths ranging from 10.1 to 59.7 cm (Figure 3.6). Mean length was 24.3 cm, and a bimodal distribution occurred from 10 to 18 cm and from 30 to 46 cm. About 25% of the fish were longer than 38.1 cm (>15 inches).

We also collected 2,104 channel catfish by tandem hoop netting, with lengths ranging from 8.1 to 53.8 cm (Figure 3.7). Mean length was 19.8 cm, and peak distribution occurred at 18 cm, with 92% of the total catch occurring within this distribution. Less than 1% were longer than 38.1 cm (>15 inches).

Northern Pike

We collected 63 northern pike by fyke netting, with lengths ranging from 42.0 to 86.5 cm (Figure 3.8). Mean length was 66.4 cm.

White Bass

We collected 1,686 white bass by day and night electrofishing, with lengths ranging from 2.5 to 34.0 cm (Figure 3.9). Mean length was 12.0 cm, and peak distribution occurred at 12 cm. Fish less than 14.0 cm are probably age 0 and contributed to 81% of the total catch. Less than 1% were longer than 22.9 cm (>9 inches).

Bluegill

We collected 2,635 bluegill by day and night electrofishing, with lengths ranging from 2.0 to 20.4 cm (Figure 3.10). Mean length was 9.1 cm, and peak distribution occurred at 6 cm. About 67% were less than

10 cm (<4 inches) and about 7% were longer than 15.2 cm (>6 inches). We also collected 660 bluegill by fyke netting, with lengths ranging from 6.0 to 21.5 cm (Figure 3.11). Mean length was 13.3 cm, and peak distribution occurred at 10 cm. About 31% were longer than 15.2 cm (>6 inches).

Largemouth Bass

We collected 607 largemouth bass by day and night electrofishing, with lengths ranging from 3.6 to 50.0 cm (Figure 3.12). Mean length was 20.4 cm, and peak distribution occurred at 6, 12, and 28 cm. The majority of fish less than 12.0 cm are probably age 0 and contributed to 23% of the total catch. About 8% were longer than 35.5 cm (>14 inches).

White Crappie

We collected 209 white crappie by fyke netting, with lengths ranging from 9.2 to 31.7 cm (Figure 3.13). Mean length was 19.1 cm, and peak distribution occurred at 16 cm. About 43% were longer than 20.3 cm (>8 inches).

Black Crappie

We collected 1,355 black crappie by fyke netting, with lengths ranging from 7.0 to 29.3 cm (Figure 3.14). Mean length was 16.9 cm, and peak distribution occurred at 16 cm. About 21% were longer than 20.3 cm (>8 inches).

Sauger

We collected 333 sauger by day and night electrofishing, with lengths ranging from 8.0 to 45.0 cm (Figure 3.15). Mean length was 20.1 cm, and peak distribution occurred at 20 cm. About 3% were longer than 30.5 cm (>12 inches).

Walleye

We collected 617 walleye by day and night electrofishing, with lengths ranging from 5.2 to 67.5 cm (Figure 3.16). Mean length was 15.8 cm, and peak distribution occurred at 14 cm. The majority of fish less than 23.0 cm are probably age 0 and contributed to 86% of the total catch. About 4% were longer than 38.1 cm (>15 inches).

Freshwater Drum

We collected 1,005 freshwater drum by day and night electrofishing, with lengths ranging from 1.5 to 48.6 cm (Figure 3.17). Mean length was 13.5 cm, and peak distribution occurred at 14 cm. Fish less than 18 cm are probably age 0 fish and contributed to 95% of the total catch. About 3% were longer than 30.5 cm (>12 inches). We also collected 1,116 freshwater drum by fyke netting, with lengths ranging from 10.5 to 53.5 cm (Figure 3.18). Mean length was 19.1 cm, and peak distribution occurred at 14 cm. About 15% were longer than 30.5 cm (>12 inches).

Table 3.1. Allocation of fish sampling effort among strata by the Long Term Resource Monitoring Program in Pool 13 of the Mississippi River during 1992. Table entries are numbers of successfully completed standardized monitoring collections.

Sampling period = 1: June 15 - July 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	CTR	TWZ	TOTAL
Day electrofishing	8		4	4			4			20
Fyke net	8						2		2	12
Tandem hoop net			4	4	2				2	12
Mini fyke net	4				2		2		2	10
Night electrofishing	8		4	4			4		2	22
Seine	4		8	8						20
Trawling				8				12	4	24
Tandem fyke net							2			2
Tandem mini fyke net							2			2
SUBTOTAL	32	0	20	28	4	0	16	12	12	124

Sampling period = 2: August 1 - September 14

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	CTR	TWZ	TOTAL
Day electrofishing	8		4	4	2		4			22
Fyke net	8						2		2	12
Tandem hoop net			4	4	2				2	12
Mini fyke net	4				2		2		2	10
Night electrofishing	8		4	4			4		2	22
Seine	4		8	8						20
Trawling				8				12	4	24
Tandem fyke net							2			2
Tandem mini fyke net							2			2
SUBTOTAL	32	0	20	28	6	0	16	12	12	126

Sampling period = 3: September 15 - October 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	CTR	TWZ	TOTAL
Day electrofishing	8		4	4	2		4			22
Fyke net	8						2		2	12
Tandem hoop net			4	4	2				2	12
Mini fyke net	4				2		2		2	10
Night electrofishing	8		4	4			4		2	22
Seine	4		8	8						20
Trawling				8				12	4	24
Tandem fyke net							2			2
Tandem mini fyke net							2			2
SUBTOTAL	32	0	20	28	6	0	16	12	12	126
	96	0	60	84	16	0	48	36	36	376

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
CTR - Main channel trough.
TWZ - Tailwater.

Table 3.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1992 in Pool 13 of the Mississippi River. See Table 3.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	H	T	TOTAL
1	Chestnut lamprey	Ichthyomyzon castaneus	1	-	-	-	-	-	-	-	-	1
2	Silver lamprey	Ichthyomyzon unicuspis	-	1	1	-	-	-	-	-	-	2
3	Shovelnose sturgeon	Scaphirhynchus platorynchus	-	-	-	-	-	-	-	-	30	30
4	Longnose gar	Lepisosteus osseus	2	51	9	-	2	-	-	35	1	100
5	Shortnose gar	Lepisosteus platostomus	22	8	18	1	14	-	1	-	-	64
6	Bowfin	Amia calva	5	12	63	-	1	-	-	-	-	81
7	Mooneye	Hiodon tergisus	39	8	-	5	-	-	1	1	1	55
8	American eel	Anguilla rostrata	-	-	-	1	-	-	-	-	-	1
9	Gizzard shad	Dorosoma cepedianum	826	246	73	13	17	1	29	1	-	1206
10	Spotfin shiner	Cyprinella spiloptera	212	104	-	-	29	-	38	-	-	383
11	Common carp	Cyprinus carpio	346	318	32	1	249	2	2050	55	3	3056
12	Speckled chub	Macrhybopsis aestivalis	-	-	-	-	2	-	17	-	18	37
13	Silver chub	Macrhybopsis storeriana	93	212	3	8	8	2	16	1	19	362
14	Golden shiner	Notemigonus crysoleucas	22	12	60	-	7	-	1	-	-	102
15	Emerald shiner	Notropis atherinoides	1991	783	-	-	458	2	1360	-	-	4594
16	River shiner	Notropis blennius	125	107	-	-	130	1	922	-	-	1285
17	Spottail shiner	Notropis hudsonius	13	14	-	-	11	1	11	-	-	50
18	Channel shiner	Notropis wickliffi	36	87	-	-	79	-	428	-	-	630
19	Pugnose minnow	Opsopoeodus emiliae	1	2	-	-	2	-	10	-	-	15
20	Southern redbelly dace	Phoxinus erythrogaster	-	-	-	-	1	-	-	-	-	1
21	Fathead minnow	Pimephales promelas	-	2	-	-	1	-	-	-	-	3
22	Bullhead minnow	Pimephales vigilax	245	272	-	-	21	3	79	-	-	620
23	Creek chub	Semotilus atromaculatus	-	-	-	-	5	-	-	-	-	5
24	River carpsucker	Carpiodes carpio	45	71	82	3	2	-	19	215	1	438
25	Quillback	Carpiodes cyprinus	5	16	8	2	-	-	2	-	1	34
26	Highfin carpsucker	Carpiodes velifer	8	17	-	-	-	-	1	2	-	28
27	White sucker	Catostomus commersoni	-	1	-	-	-	-	-	-	-	1
28	Blue sucker	Cycleptus elongatus	1	-	-	-	-	-	1	-	1	3
29	Smallmouth buffalo	Ictiobus bubalus	52	60	9	1	9	-	1583	351	-	2065
30	Bigmouth buffalo	Ictiobus cyprinellus	12	5	2	-	-	-	3	-	-	22
31	Black buffalo	Ictiobus niger	4	-	-	-	-	-	-	1	-	5
32	Spotted sucker	Minytrema melanops	38	44	41	-	-	-	2	1	-	126
33	Silver redhorse	Moxostoma anisurum	2	-	-	-	-	-	-	-	-	2
34	Golden redhorse	Moxostoma erythrurum	12	-	2	-	-	-	2	-	-	16
35	Shorthead redhorse	Moxostoma macrolepidotum	140	160	35	55	16	-	104	12	2	524
36	Black bullhead	Ameiurus melas	-	-	2	-	4	-	-	3	-	9
37	Yellow bullhead	Ameiurus natalis	-	2	49	-	6	-	-	2	-	59
38	Channel catfish	Ictalurus punctatus	23	74	30	1	1	-	2	2104	217	2452
39	Stonecat	Noturus flavus	-	-	-	-	-	-	-	-	2	2
40	Tadpole madtom	Noturus gyrinus	2	-	-	-	8	-	72	-	-	82

Gears: D - Day electrofishing
N - Night electrofishing
F - Fyke netting
M - Mini fyke netting
T - Trawling (4.8-m bottom trawl)
S - Seining
H - Tandem hoop netting
X - Tandem fyke netting
Y - Tandem min fyke netting

Table 3.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1992 in Pool 13 of the Mississippi River. See Table 3.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	H	T	TOTAL
41	Flathead catfish	Pylodictis olivaris	13	17	12	-	1	-	-	14	5	62
42	Northern pike	Esox lucius	10	15	63	-	1	-	-	1	-	90
43	Brook silverside	Labidesthes sicculus	10	39	-	-	6	-	3	-	-	58
44	White bass	Morone chrysops	218	1468	1381	27	111	9	287	55	6	3562
45	Yellow bass	Morone mississippiensis	4	4	2	-	-	-	-	-	-	10
46	Rock bass	Ambloplites rupestris	3	3	2	-	-	-	-	-	-	8
47	Green sunfish	Lepomis cyanellus	-	2	-	-	-	-	-	-	-	2
48	Pumpkinseed	Lepomis gibbosus	14	9	22	6	-	-	1	-	-	52
49	Warmouth	Lepomis gulosus	1	-	1	-	-	-	-	-	-	2
50	Orangespotted sunfish	Lepomis humilis	184	290	1	-	4	-	27	-	-	506
51	Bluegill	Lepomis macrochirus	903	1732	643	17	80	1	158	12	1	3547
52	Green sunfish x bluegill	L. cyanellus x L. macrochirus	-	-	1	-	1	-	1	-	-	3
53	Smallmouth bass	Micropterus dolomieu	5	16	-	-	-	-	-	-	-	21
54	Largemouth bass	Micropterus salmoides	340	267	44	1	9	-	24	-	-	685
55	White crappie	Pomoxis annularis	45	40	208	1	18	-	12	2	-	326
56	Black crappie	Pomoxis nigromaculatus	60	137	1351	4	22	-	2	50	1	1627
57	Western sand darter	Ammocrypta clara	-	-	-	-	-	-	3	-	-	3
58	Mud darter	Etheostoma asprigene	7	2	-	-	3	-	8	-	-	20
59	Johnny darter	Etheostoma nigrum	6	4	-	-	1	-	7	-	-	18
60	Yellow perch	Perca flavescens	3	2	1	-	-	-	2	-	-	8
61	Logperch	Percina caprodes	86	54	-	-	9	-	17	-	-	166
62	River darter	Percina shumardi	29	18	-	-	34	2	85	-	1	169
63	Sauger	Stizostedion canadense	44	289	26	3	9	-	2	3	14	390
64	Walleye	Stizostedion vitreum	86	531	14	2	10	1	10	2	4	660
65	Freshwater drum	Aplodinotus grunniens	88	917	1072	44	21	5	38	269	217	2671
			6482	8545	5363	196	1423	30	7441	3192	545	33217

Gears: D - Day electrofishing
N - Night electrofishing
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M - Mini fyke netting
T - Trawling (4.8-m bottom trawl)
S - Seining
H - Tandem hoop netting
X - Tandem fyke netting
Y - Tandem min fyke netting

Table 3.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by day electrofishing in Pool 13 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Chestnut lamprey		0.04								
		(0.04)								
Longnose gar		0.04			0.08					
		(0.04)			(0.08)					
Shortnose gar		0.17				1.75	0.33			
		(0.08)				(1.75)	(0.14)			
Bowfin		0.21								
		(0.10)								
Mooneye		0.21		0.25	0.33	0.63	1.83			
		(0.17)		(0.18)	(0.19)	(0.63)	(0.91)			
Gizzard shad		20.21		8.00	8.58	3.75	9.33			
		(5.56)		(2.11)	(2.46)	(3.59)	(3.60)			
Spotfin shiner		4.21		0.42	4.67	0.50	3.83			
		(1.98)		(0.34)	(2.13)	(0.50)	(1.81)			
Common carp		6.04		0.58	5.33	5.75	7.00			
		(1.27)		(0.29)	(2.32)	(2.42)	(1.92)			
Silver chub		1.21			2.42		2.92			
		(0.39)			(1.21)		(1.84)			
Golden shiner		0.92								
		(0.31)								
Emerald shiner		42.21		19.50	6.58	5.75	51.58			
		(12.56)		(8.57)	(2.66)	(5.75)	(20.68)			
River shiner		3.38			2.25	0.63	1.00			
		(1.24)			(0.54)	(0.63)	(0.49)			
Spottail shiner		0.29			0.50					
		(0.19)			(0.23)					
Channel shiner		0.96			0.42	0.13	0.58			
		(0.39)			(0.23)	(0.13)	(0.19)			
Pugnose minnow		0.04								
		(0.04)								
Bullhead minnow		7.21		0.25	2.75		3.00			
		(1.76)		(0.25)	(0.72)		(1.47)			
River carpsucker		0.71		1.50	0.42		0.42			
		(0.27)		(1.00)	(0.19)		(0.23)			
Quillback		0.08			0.25					
		(0.08)			(0.13)					
Highfin carpsucker		0.33								
		(0.25)								
Blue sucker							0.08			
							(0.08)			
Smallmouth buffalo		1.21		0.08	0.92	0.13	0.83			
		(0.45)		(0.08)	(0.51)	(0.13)	(0.39)			
Bigmouth buffalo		0.42			0.08	0.13				
		(0.22)			(0.08)	(0.13)				
Black buffalo		0.13				0.13				
		(0.09)				(0.13)				
Spotted sucker		1.58								
		(0.51)								
Silver redhorse						0.25				
						(0.14)				
Golden redhorse		0.13			0.17	0.88				
		(0.07)			(0.11)	(0.88)				
Shorthead redhorse		2.17		0.08	1.00	7.38	1.33			
		(0.80)		(0.08)	(0.58)	(2.28)	(0.43)			
Channel catfish		0.42			0.17	1.13	0.17			
		(0.22)			(0.11)	(0.63)	(0.17)			
Tadpole madtom		0.08								
		(0.08)								
Flathead catfish		0.08			0.33	0.63	0.17			
		(0.06)			(0.19)	(0.38)	(0.11)			

Strata: BWCS - Backwater, contiguous, shoreline
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IMPO - Impounded, offshore
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MCBW - Main channel border, wing dam
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CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 3.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by day electrofishing in Pool 13 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Northern pike		0.38		0.08						
		(0.23)		(0.08)						
Brook silverside		0.29			0.08		0.17			
		(0.21)			(0.08)		(0.17)			
White bass		4.79		1.08	6.08	0.25	1.25			
		(1.72)		(0.57)	(1.23)	(0.14)	(0.37)			
Yellow bass					0.17	0.13	0.08			
					(0.11)	(0.13)	(0.08)			
Rock bass		0.08			0.08					
		(0.08)			(0.08)					
Pumpkinseed		0.54					0.08			
		(0.23)					(0.08)			
Warmouth		0.04								
		(0.04)								
Orangespotted sunfish		6.96			0.17		1.25			
		(1.50)			(0.11)		(0.43)			
Bluegill		32.21		1.58	1.67	2.00	6.25			
		(7.58)		(0.81)	(0.48)	(1.17)	(3.51)			
Smallmouth bass						0.38	0.17			
						(0.24)	(0.11)			
Largemouth bass		11.29		0.83	1.17	2.00	2.42			
		(2.11)		(0.46)	(0.34)	(1.15)	(1.08)			
White crappie		1.79			0.17					
		(0.56)			(0.11)					
Black crappie		2.29			0.25		0.17			
		(0.64)			(0.25)		(0.17)			
Mud darter		0.21		0.17						
		(0.10)		(0.11)						
Johnny darter		0.25								
		(0.09)								
Yellow perch		0.13								
		(0.07)								
Logperch		1.33		3.67	0.25		0.58			
		(0.49)		(1.60)	(0.18)		(0.29)			
River darter		0.38		0.83	0.17		0.67			
		(0.22)		(0.41)	(0.11)		(0.33)			
Sauger		1.38		0.08	0.58	0.13	0.17			
		(0.33)		(0.08)	(0.23)	(0.13)	(0.11)			
Walleye		1.04		1.33	0.92	1.75	1.67			
		(0.27)		(0.91)	(0.34)	(1.01)	(0.63)			
Freshwater drum		1.75		0.50	1.50	0.38	1.58			
		(0.48)		(0.29)	(0.78)	(0.13)	(0.65)			

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SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 3.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by night electrofishing in Pool 13 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Silver lamprey										0.17
										(0.17)
Longnose gar		0.46			0.58		1.67			2.17
		(0.21)			(0.31)		(0.38)			(1.22)
Shortnose gar		0.21			0.08					0.33
		(0.13)			(0.08)					(0.21)
Bowfin		0.29			0.08		0.08			0.50
		(0.13)			(0.08)		(0.08)			(0.34)
Mooneye		0.04		0.33			0.08			0.33
		(0.04)		(0.14)			(0.08)			(0.33)
Gizzard shad		6.46		3.58	1.92		0.42			3.33
		(1.53)		(1.28)	(1.13)		(0.26)			(0.95)
Spotfin shiner		1.33		0.33	2.58		3.00			0.17
		(0.71)		(0.19)	(1.55)		(1.09)			(0.17)
Common carp		5.63		0.67	5.08		6.67			5.67
		(1.46)		(0.33)	(0.96)		(1.77)			(1.91)
Silver chub		4.13		0.42	2.75		4.33			3.83
		(1.13)		(0.29)	(0.78)		(1.86)			(1.96)
Golden shiner		0.50								
		(0.31)								
Emerald shiner		21.83		0.67	5.67		12.50			5.50
		(4.58)		(0.33)	(1.84)		(5.43)			(3.03)
River shiner		0.58			1.42		5.58			1.50
		(0.32)			(0.99)		(4.09)			(1.15)
Spottail shiner		0.38		0.33			0.08			
		(0.23)		(0.22)			(0.08)			
Channel shiner		0.75			2.00		3.42			0.67
		(0.26)			(1.83)		(1.78)			(0.33)
Pugnose minnow		0.08								
		(0.08)								
Fathead minnow		0.04			0.08					
		(0.04)			(0.08)					
Bullhead minnow		8.29		0.33	1.17		4.25			0.67
		(2.88)		(0.19)	(0.51)		(1.21)			(0.21)
River carpsucker		1.96		0.08	1.00		0.50			0.83
		(0.84)		(0.08)	(0.48)		(0.23)			(0.48)
Quillback		0.17		0.58	0.25		0.17			
		(0.13)		(0.50)	(0.18)		(0.17)			
Highfin carpsucker		0.04			0.33		0.08			1.83
		(0.04)			(0.19)		(0.08)			(1.11)
White sucker										0.17
										(0.17)
Smallmouth buffalo		0.63		1.83	0.67		0.75			1.00
		(0.18)		(0.94)	(0.26)		(0.22)			(0.52)
Bigmouth buffalo		0.13					0.17			
		(0.07)					(0.11)			
Spotted sucker		1.46					0.08			1.33
		(0.53)					(0.08)			(0.61)
Shorthead redhorse		1.71		1.67	1.25		6.67			0.67
		(0.53)		(1.08)	(0.43)		(2.91)			(0.33)
Yellow bullhead		0.04					0.08			
		(0.04)					(0.08)			
Channel catfish		1.13		0.25	2.25		1.08			0.67
		(0.49)		(0.18)	(1.07)		(0.29)			(0.42)
Flathead catfish		0.08		0.08	0.25		0.08			1.67
		(0.06)		(0.08)	(0.18)		(0.08)			(0.76)
Northern pike		0.54			0.17					
		(0.26)			(0.11)					
Brook silverside		1.33		0.08	0.08					0.83
		(0.68)		(0.08)	(0.08)					(0.31)

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Table 3.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by night electrofishing in Pool 13 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
White bass		12.29		19.83	12.25		3.83			123.67
		(2.97)		(9.11)	(1.88)		(1.06)			(66.37)
Yellow bass		0.17								
		(0.10)								
Rock bass					0.25					
					(0.13)					
Green sunfish										0.33
										(0.21)
Pumpkinseed		0.08								1.17
		(0.08)								(0.48)
Orangespotted sunfish		10.67			0.17		1.83			1.67
		(2.45)			(0.17)		(0.85)			(0.92)
Bluegill		54.17		1.17	2.25		22.67			19.83
		(10.41)		(0.66)	(0.75)		(10.38)			(4.64)
Smallmouth bass				0.17			0.08			2.17
				(0.17)			(0.08)			(0.70)
Largemouth bass		7.04		1.58	1.17		2.67			5.50
		(0.95)		(0.71)	(0.27)		(1.09)			(1.12)
White crappie		1.17		0.17						1.67
		(0.31)		(0.11)						(0.42)
Black crappie		3.79			1.33		0.42			4.17
		(0.82)			(0.54)		(0.19)			(0.60)
Mud darter		0.08								
		(0.06)								
Johnny darter		0.17								
		(0.08)								
Yellow perch		0.04			0.08					
		(0.04)			(0.08)					
Logperch		0.58		1.92	0.25		0.83			0.67
		(0.17)		(0.87)	(0.13)		(0.46)			(0.49)
River darter		0.21		0.08	0.25		0.58			0.33
		(0.10)		(0.08)	(0.25)		(0.34)			(0.33)
Sauger		2.58		1.50	5.17		4.00			16.50
		(0.66)		(1.08)	(1.13)		(0.98)			(5.53)
Walleye		1.92		23.33	2.67		6.92			15.00
		(0.53)		(11.87)	(0.80)		(3.02)			(6.55)
Freshwater drum		5.21		3.67	23.00		3.00			72.67
		(1.44)		(2.39)	(9.69)		(0.52)			(43.49)

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Table 3.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by fyke netting in Pool 13 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Silver lamprey										0.17
										(0.17)
Longnose gar				0.17						1.32
				(0.17)						(0.71)
Shortnose gar		0.46		0.34						0.82
		(0.18)		(0.21)						(0.64)
Bowfin		2.40								0.84
		(0.78)								(0.84)
Gizzard shad		2.13		2.66						0.80
		(1.60)		(1.16)						(0.45)
Common carp		0.73		0.67						1.66
		(0.18)		(0.33)						(0.85)
Silver chub		0.04								0.32
		(0.04)								(0.20)
Golden shiner		2.26		0.33						0.16
		(1.46)		(0.33)						(0.16)
River carpsucker		1.28		0.51						8.00
		(0.37)		(0.51)						(5.01)
Quillback		0.04		0.99						0.16
		(0.04)		(0.99)						(0.16)
Smallmouth buffalo		0.04		0.50						0.84
		(0.04)		(0.34)						(0.84)
Bigmouth buffalo		0.04								0.17
		(0.04)								(0.17)
Spotted sucker		1.49		0.17						0.67
		(0.77)		(0.17)						(0.50)
Golden redhorse										0.33
										(0.21)
Shorthead redhorse		0.69								2.95
		(0.29)								(2.21)
Black bullhead										0.33
										(0.21)
Yellow bullhead		0.33		6.35						0.50
		(0.18)		(3.77)						(0.34)
Channel catfish		0.78		0.17						1.64
		(0.28)		(0.17)						(1.26)
Flathead catfish		0.04		0.17						1.66
		(0.04)		(0.17)						(1.09)
Northern pike		1.33								5.14
		(0.35)								(2.93)
White bass		6.29		18.30						179.63
		(2.88)		(12.19)						(120.08)
Yellow bass		0.08								
		(0.08)								
Rock bass										0.33
										(0.21)
Pumpkinseed		0.16		2.84						0.16
		(0.10)		(0.70)						(0.16)
Warmouth		0.04								
		(0.04)								
Orangespotted sunfish		0.04								
		(0.04)								
Bluegill		14.92		27.00						19.20
		(3.91)		(9.92)						(11.35)
Green sunfish x bluegill		0.04								
		(0.04)								
Largemouth bass		1.20		0.34						2.10
		(0.75)		(0.21)						(0.82)
White crappie		8.00								1.80
		(1.62)								(0.74)

Strata: BWCS - Backwater, contiguous, shoreline
BWCO - Backwater, contiguous, offshore
IMPS - Impounded, shoreline
IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 3.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by fyke netting in Pool 13 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Black crappie		44.91		16.04						26.99
		(9.09)		(12.53)						(9.63)
Yellow perch		0.04								
		(0.04)								
Sauger		0.54		0.84						1.30
		(0.23)		(0.40)						(0.82)
Walleye		0.08		1.16						0.83
		(0.05)		(0.74)						(0.31)
Freshwater drum		36.81								29.78
		(33.76)								(18.26)

Strata: BWCS - Backwater, contiguous, shoreline
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IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 3.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by tandem fyke netting in Pool 13 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Shortnose gar			0.08							
			(0.08)							
Mooneye			0.42							
			(0.15)							
American eel			0.09							
			(0.09)							
Gizzard shad			1.08							
			(0.39)							
Common carp			0.09							
			(0.09)							
Silver chub			0.66							
			(0.44)							
River carpsucker			0.25							
			(0.17)							
Quillback			0.17							
			(0.11)							
Smallmouth buffalo			0.08							
			(0.08)							
Shorthead redhorse			4.66							
			(2.65)							
Channel catfish			0.08							
			(0.08)							
White bass			2.25							
			(0.36)							
Pumpkinseed			0.50							
			(0.50)							
Bluegill			1.42							
			(0.65)							
Largemouth bass			0.09							
			(0.09)							
White crappie			0.08							
			(0.08)							
Black crappie			0.33							
			(0.25)							
Sauger			0.25							
			(0.17)							
Walleye			0.17							
			(0.11)							
Freshwater drum			3.70							
			(1.25)							

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MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 3.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by mini fyke netting in Pool 13 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Longnose gar		0.08 (0.08)				0.16 (0.16)				
Shortnose gar		0.08 (0.08)		0.17 (0.17)		1.65 (1.46)				0.33 (0.33)
Bowfin										0.17 (0.17)
Gizzard shad		0.25 (0.13)								2.33 (1.38)
Spotfin shiner		0.43 (0.30)		1.83 (0.94)		2.10 (1.38)				
Common carp		0.08 (0.08)		38.50 (24.32)		0.17 (0.17)				2.67 (2.47)
Speckled chub										0.32 (0.20)
Silver chub		0.09 (0.09)								1.15 (0.54)
Golden shiner		0.51 (0.27)				0.16 (0.16)				
Emerald shiner		6.68 (3.53)		50.40 (39.72)		8.43 (4.14)				3.89 (2.47)
River shiner		0.33 (0.26)		17.54 (12.61)		2.94 (1.46)				0.32 (0.32)
Spottail shiner		0.08 (0.08)		1.17 (0.75)		0.33 (0.33)				0.17 (0.17)
Channel shiner		0.17 (0.17)		1.50 (1.02)		10.76 (9.63)				0.16 (0.16)
Pugnose minnow		0.17 (0.12)								
Southern redbelly dace		0.08 (0.08)								
Fathead minnow		0.09 (0.09)								
Bullhead minnow		0.85 (0.47)		0.50 (0.22)		0.33 (0.21)				0.99 (0.51)
Creek chub						0.80 (0.80)				
River carpsucker										0.33 (0.21)
Smallmouth buffalo		0.42 (0.19)		0.67 (0.33)						
Shorthead redhorse		0.99 (0.66)				0.66 (0.33)				
Black bullhead		0.17 (0.11)		0.33 (0.33)						
Yellow bullhead				0.50 (0.34)		0.32 (0.32)				0.17 (0.17)
Channel catfish				0.17 (0.17)						
Tadpole madtom		0.08 (0.08)		1.17 (0.65)						
Flathead catfish				0.17 (0.17)						
Northern pike						0.16 (0.16)				
Brook silverside		0.08 (0.08)		0.83 (0.48)						
White bass		0.42 (0.26)		0.67 (0.33)		0.49 (0.34)				16.08 (13.14)
Orangespotted sunfish		0.34 (0.14)								

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SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 3.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by mini fyke netting in Pool 13 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Bluegill		3.59		3.17		0.97				1.95
		(0.83)		(2.02)		(0.61)				(0.66)
Green sunfish x bluegill										0.16
										(0.16)
Largemouth bass				1.00		0.17				0.33
				(0.63)		(0.17)				(0.21)
White crappie		0.50				1.64				0.33
		(0.23)				(0.71)				(0.21)
Black crappie		0.33				1.48				1.48
		(0.14)				(0.76)				(0.66)
Mud darter		0.17		0.17						
		(0.17)		(0.17)						
Johnny darter				0.17						
				(0.17)						
Logperch		0.60		0.33						
		(0.32)		(0.33)						
River darter		2.58		0.17		0.16				0.17
		(1.75)		(0.17)		(0.16)				(0.17)
Sauger						0.49				0.97
						(0.34)				(0.79)
Walleye		0.17		0.83		0.32				0.16
		(0.17)		(0.40)		(0.20)				(0.16)
Freshwater drum		0.75		0.50		0.16				1.31
		(0.39)		(0.50)		(0.16)				(0.55)

Strata: BWCS - Backwater, contiguous, shoreline
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IMPO - Impounded, offshore
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MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 3.3.6. Mean catch-per-unit-effort and (standard error) for fishes collected by tandem mini fyke netting in Pool 13 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Gizzard shad			0.08							
			(0.08)							
Common carp			0.17							
			(0.17)							
Silver chub			0.17							
			(0.11)							
Emerald shiner			0.17							
			(0.17)							
River shiner			0.08							
			(0.08)							
Spottail shiner			0.08							
			(0.08)							
Bullhead minnow			0.25							
			(0.11)							
White bass			0.74							
			(0.28)							
Bluegill			0.08							
			(0.08)							
River darter			0.16							
			(0.10)							
Walleye			0.08							
			(0.08)							
Freshwater drum			0.41							
			(0.27)							

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IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 3.3.7. Mean catch-per-unit-effort and (standard error) for fishes collected by tandem hoop netting in Pool 13 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Longnose gar					1.32 (1.23)		0.09 (0.09)			0.08 (0.08)
Mooneye					0.04 (0.04)					
Gizzard shad					0.04 (0.04)					
Common carp					0.04 (0.04)	0.08 (0.08)	0.21 (0.14)			3.98 (1.93)
Silver chub										0.08 (0.08)
River carpsucker					0.04 (0.04)	0.08 (0.08)	0.04 (0.04)			17.72 (10.61)
Highfin carpsucker										0.17 (0.17)
Smallmouth buffalo					2.74 (1.41)	1.92 (1.02)	4.15 (1.74)			13.35 (6.55)
Black buffalo							0.04 (0.04)			
Spotted sucker										0.08 (0.08)
Shorthead redhorse					0.29 (0.18)		0.08 (0.06)			0.24 (0.17)
Black bullhead										0.25 (0.11)
Yellow bullhead					0.04 (0.04)					0.08 (0.08)
Channel catfish					4.71 (3.33)	0.58 (0.24)	1.48 (0.51)			158.32 (123.31)
Flathead catfish					0.21 (0.07)	0.08 (0.08)	0.17 (0.11)			0.34 (0.25)
Northern pike					0.04 (0.04)					
White bass					0.37 (0.20)	0.66 (0.40)	0.12 (0.09)			2.86 (1.93)
Bluegill					0.17 (0.13)		0.29 (0.17)			0.08 (0.08)
White crappie					0.04 (0.04)					0.08 (0.08)
Black crappie					0.75 (0.24)		0.17 (0.10)			2.30 (1.30)
Sauger										0.25 (0.17)
Walleye										0.16 (0.10)
Freshwater drum					2.44 (0.73)	0.50 (0.34)	0.54 (0.13)			15.75 (8.41)

Strata: BWCS - Backwater, contiguous, shoreline
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IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 3.3.8. Mean catch-per-unit-effort and (standard error) for fishes collected by seining in Pool 13 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Shortnose gar					0.04 (0.04)					
Mooneye		0.08 (0.08)								
Gizzard shad		1.33 (1.16)			0.21 (0.21)		0.33 (0.19)			
Spotfin shiner		0.67 (0.45)			0.29 (0.22)		0.96 (0.53)			
Common carp		0.08 (0.08)			83.83 (77.05)		1.54 (1.25)			
Speckled chub							0.71 (0.46)			
Silver chub		0.67 (0.36)					0.33 (0.17)			
Golden shiner		0.08 (0.08)								
Emerald shiner		9.75 (4.34)			16.63 (7.59)		35.17 (13.41)			
River shiner		2.17 (1.16)			13.88 (6.11)		23.46 (18.83)			
Spottail shiner		0.75 (0.58)			0.04 (0.04)		0.04 (0.04)			
Channel shiner		0.25 (0.25)			6.25 (1.48)		11.46 (2.35)			
Pugnose minnow		0.67 (0.33)			0.08 (0.06)					
Bullhead minnow		1.75 (0.59)			0.38 (0.13)		2.04 (0.53)			
River carpsucker					0.25 (0.25)		0.54 (0.46)			
Quillback					0.08 (0.06)					
Highfin carpsucker		0.08 (0.08)								
Blue sucker							0.04 (0.04)			
Smallmouth buffalo		0.33 (0.19)			64.08 (61.83)		1.71 (1.20)			
Bigmouth buffalo							0.13 (0.13)			
Spotted sucker		0.17 (0.11)								
Golden redhorse							0.08 (0.06)			
Shorthead redhorse		2.83 (1.65)			2.17 (1.01)		0.75 (0.27)			
Channel catfish		0.08 (0.08)					0.04 (0.04)			
Tadpole madtom		0.33 (0.26)			2.83 (2.06)					
Brook silverside		0.08 (0.08)			0.04 (0.04)		0.04 (0.04)			
White bass		22.17 (15.11)			0.25 (0.09)		0.63 (0.25)			
Pumpkinseed		0.08 (0.08)								
Orangespotted sunfish		2.00 (0.77)					0.13 (0.09)			
Bluegill		10.83 (2.67)			0.17 (0.10)		1.00 (0.66)			

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IMPO - Impounded, offshore
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SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 3.3.8. Mean catch-per-unit-effort and (standard error) for fishes collected by seining in Pool 13 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Green sunfish x bluegill		0.08								
		(0.08)								
Largemouth bass		1.42			0.13		0.17			
		(0.42)			(0.09)		(0.10)			
White crappie		1.00								
		(0.44)								
Black crappie		0.17								
		(0.17)								
Western sand darter					0.04		0.08			
					(0.04)		(0.08)			
Mud darter		0.42			0.04		0.08			
		(0.26)			(0.04)		(0.06)			
Johnny darter		0.33			0.08		0.04			
		(0.26)			(0.06)		(0.04)			
Yellow perch					0.04		0.04			
					(0.04)		(0.04)			
Logperch		0.83					0.29			
		(0.51)					(0.13)			
River darter		2.58			0.71		1.54			
		(1.07)			(0.26)		(0.43)			
Sauger		0.08			0.04					
		(0.08)			(0.04)					
Walleye					0.17		0.25			
					(0.08)		(0.11)			
Freshwater drum		0.50			0.29		1.04			
		(0.29)			(0.19)		(0.33)			

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SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 3.3.9. Mean catch-per-unit-effort and (standard error) for fishes collected by bottom trawling in Pool 13 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Shovelnose sturgeon					0.13 (0.09)			0.58 (0.19)		0.50 (0.19)
Longnose gar					0.04 (0.04)					
Mooneye					0.04 (0.04)					
Common carp					0.13 (0.09)					
Speckled chub					0.58 (0.46)			0.06 (0.04)		0.17 (0.11)
Silver chub					0.58 (0.25)			0.11 (0.07)		0.08 (0.08)
River carpsucker					0.04 (0.04)					
Quillback					0.04 (0.04)					
Blue sucker								0.03 (0.03)		
Shorthead redhorse					0.04 (0.04)			0.03 (0.03)		
Channel catfish					1.54 (0.50)			2.61 (1.21)		7.17 (3.45)
Stonecat					0.08 (0.08)					
Flathead catfish					0.04 (0.04)			0.08 (0.05)		0.08 (0.08)
White bass					0.13 (0.09)					0.25 (0.25)
Bluegill					0.04 (0.04)					
Black crappie										0.08 (0.08)
River darter					0.04 (0.04)					
Sauger					0.58 (0.34)					
Walleye					0.13 (0.09)			0.03 (0.03)		
Freshwater drum					6.21 (1.40)			0.39 (0.17)		4.50 (1.62)

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IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

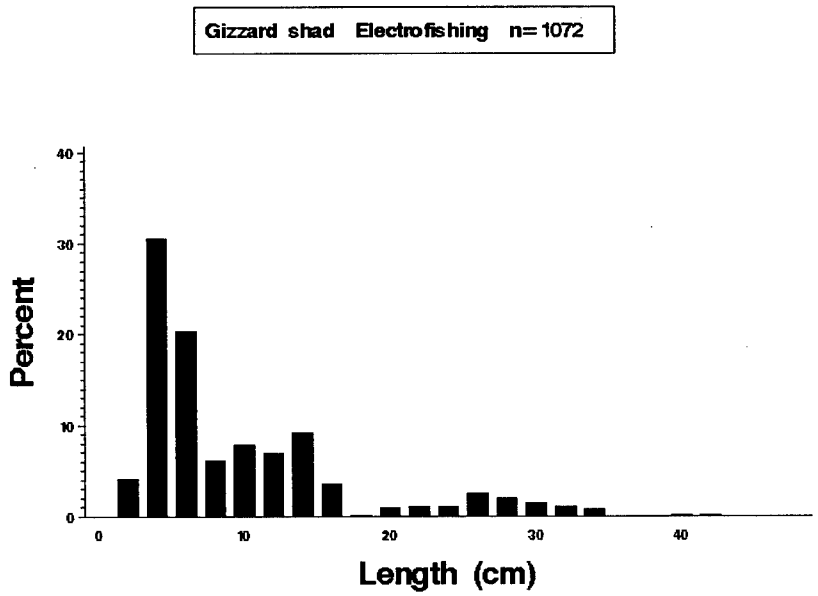

Figure 3.2. Length distributions (*length*) as a percentage of catch (*percent*) for gizzard shad (*Dorosoma cepedianum*) collected by electrofishing in Upper Mississippi River Pool 13 during 1992.

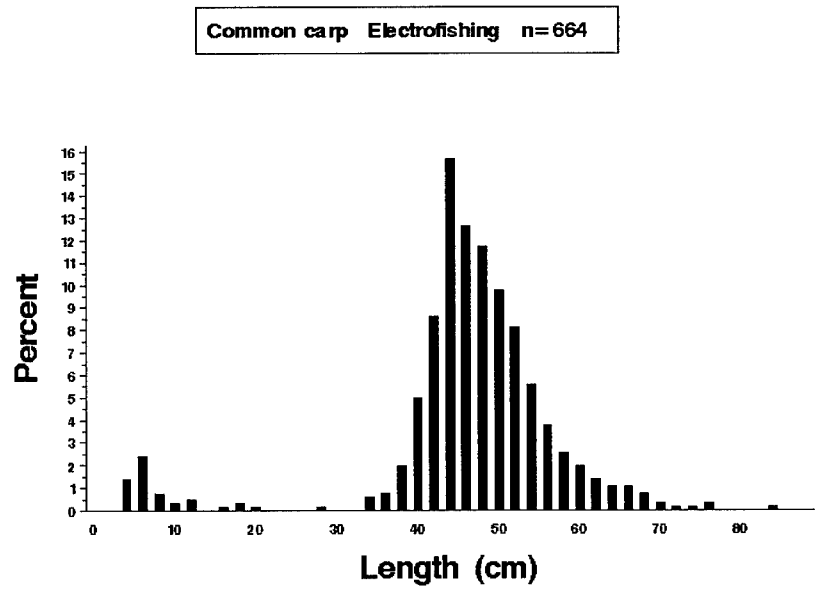

Figure 3.3. Length distributions (*length*) as a percentage of catch (*percent*) for common carp (*Cyprinus carpio*) collected by electrofishing in Upper Mississippi River Pool 13 during 1992.

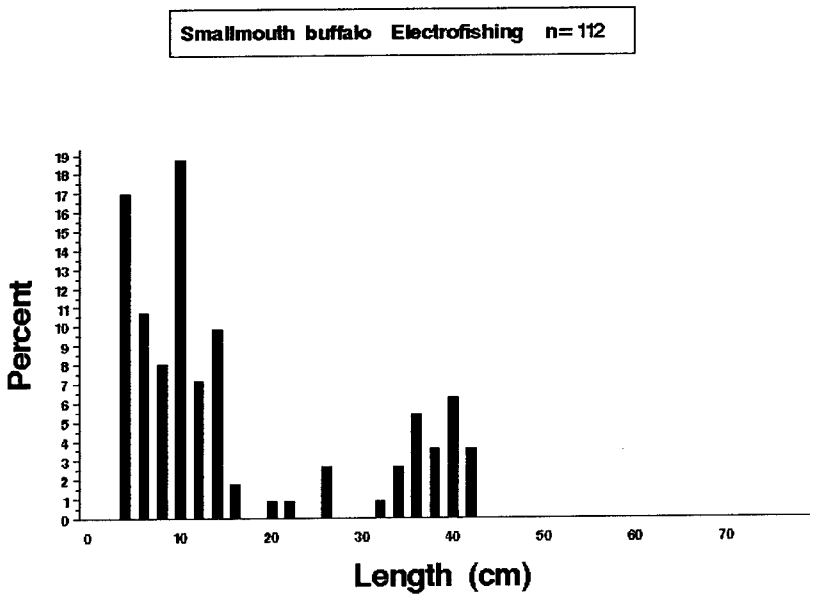

Figure 3.4. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by electrofishing in Upper Mississippi River Pool 13 during 1992.

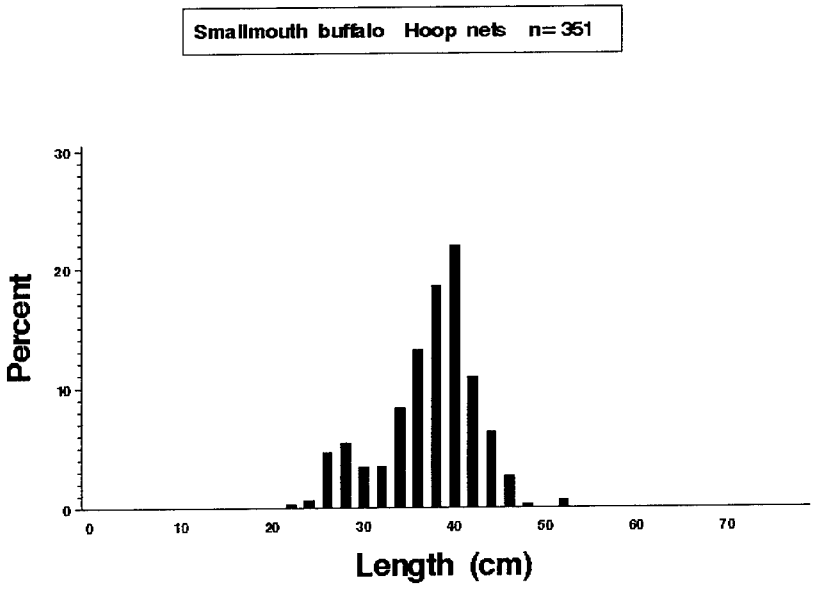

Figure 3.5. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by large and small hoop netting in Upper Mississippi River Pool 13 during 1992.

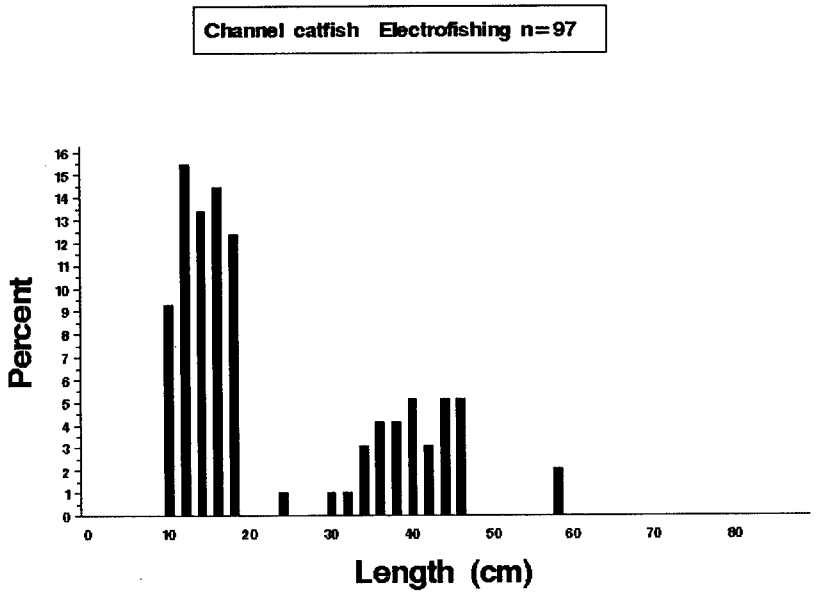

Figure 3.6. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by electrofishing in Upper Mississippi River Pool 13 during 1992.

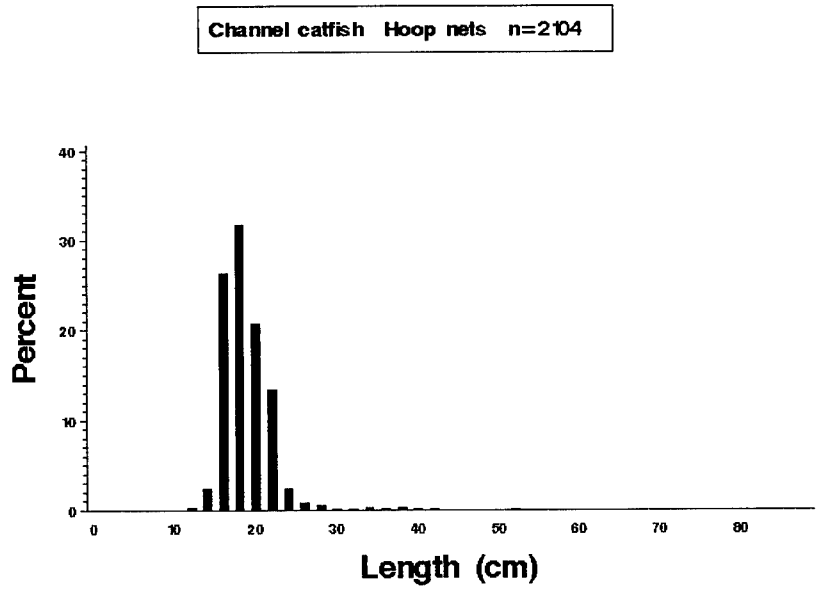

Figure 3.7. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by large and small hoop netting in Upper Mississippi River Pool 13 during 1992.

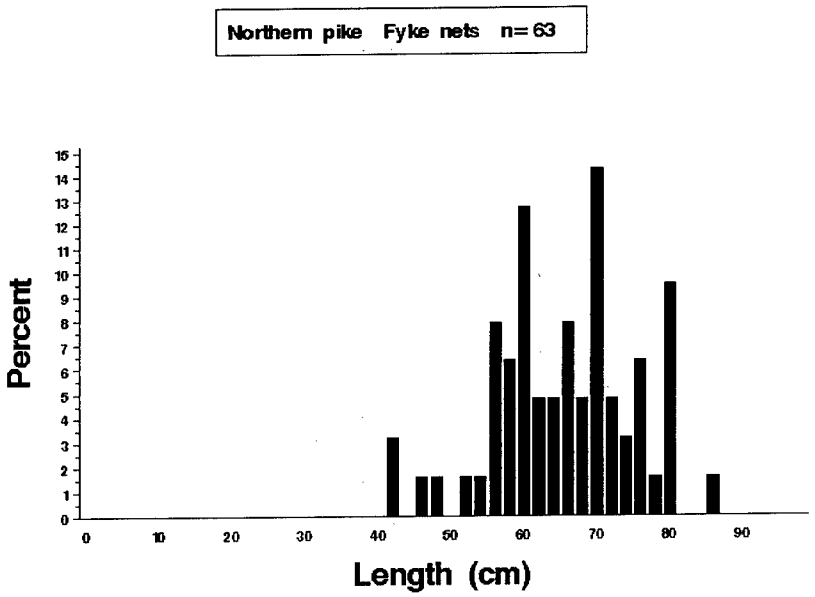

Figure 3.8. Length distributions (*length*) as a percentage of catch (*percent*) for northern pike (*Esox lucius*) collected by fyke netting in Upper Mississippi River Pool 13 during 1992.

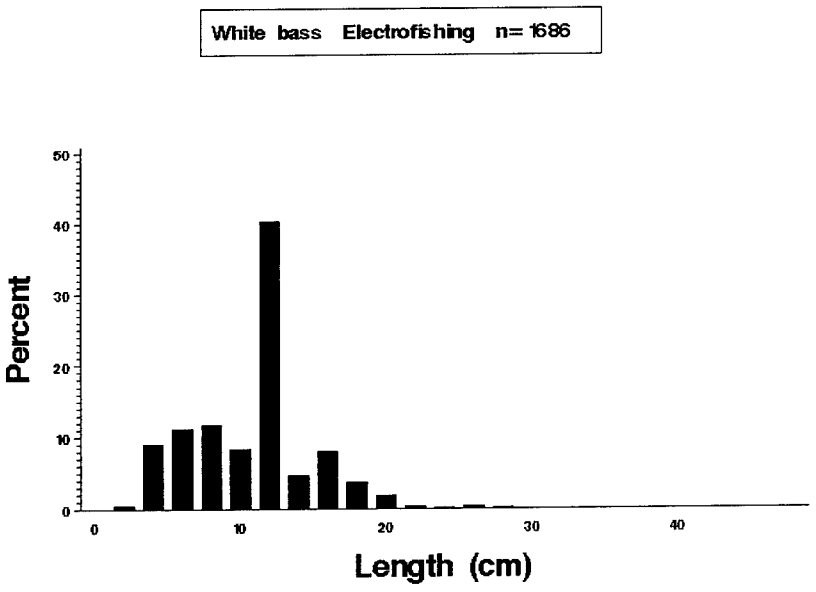

Figure 3.9. Length distributions (*length*) as a percentage of catch (*percent*) for white bass (*Morone chryops*) collected by electrofishing in Upper Mississippi River Pool 13 during 1992.

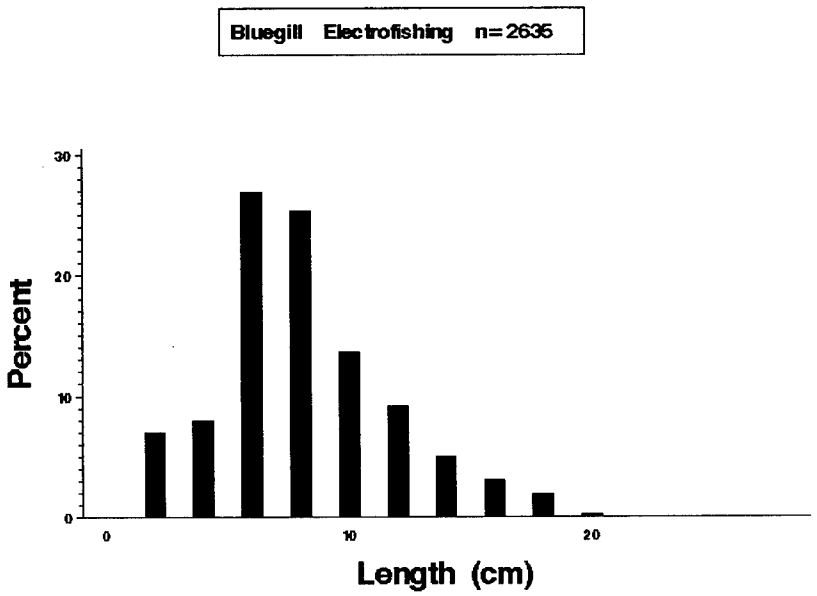

Figure 3.10. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by electrofishing in Upper Mississippi River Pool 13 during 1992.

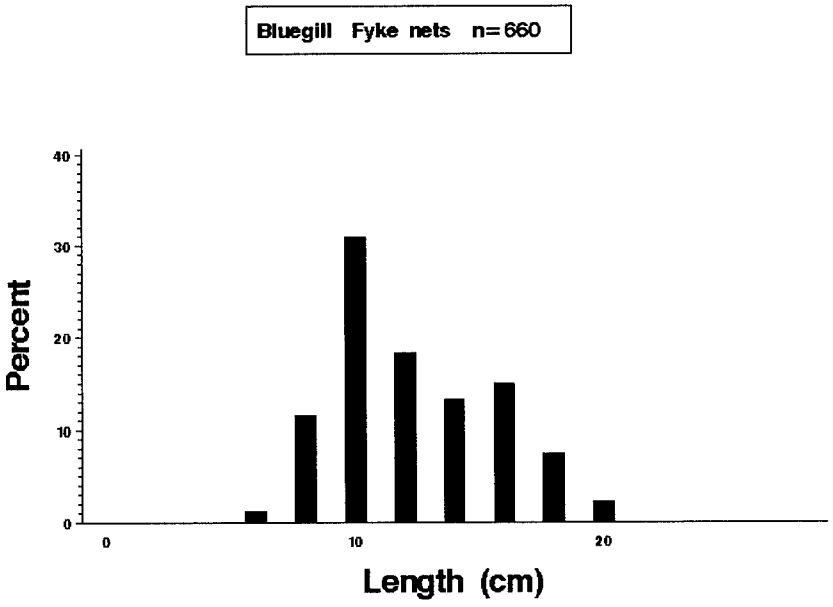

Figure 3.11. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by fyke netting in Upper Mississippi River Pool 13 during 1992.

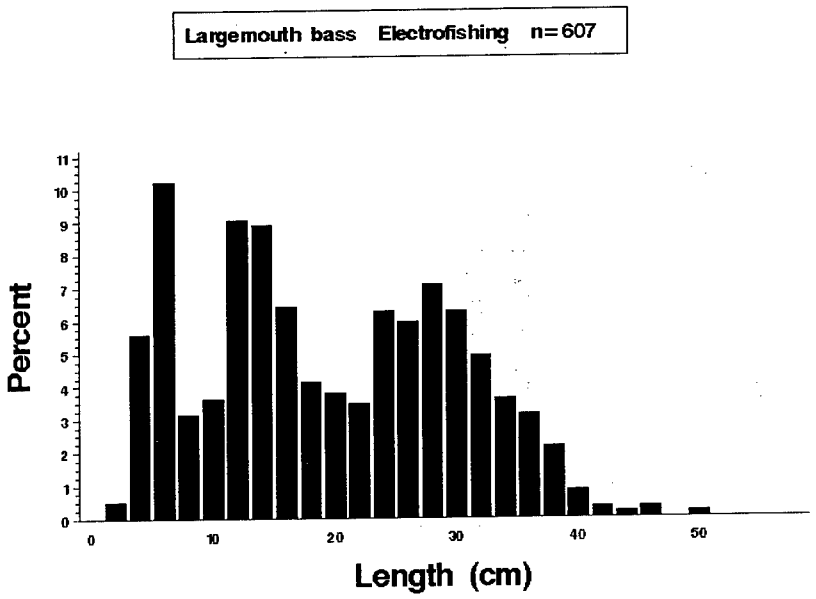

Figure 3.12. Length distributions (*length*) as a percentage of catch (*percent*) for largemouth bass (*Micropterus salmoides*) collected by electrofishing in Upper Mississippi River Pool 13 during 1992.

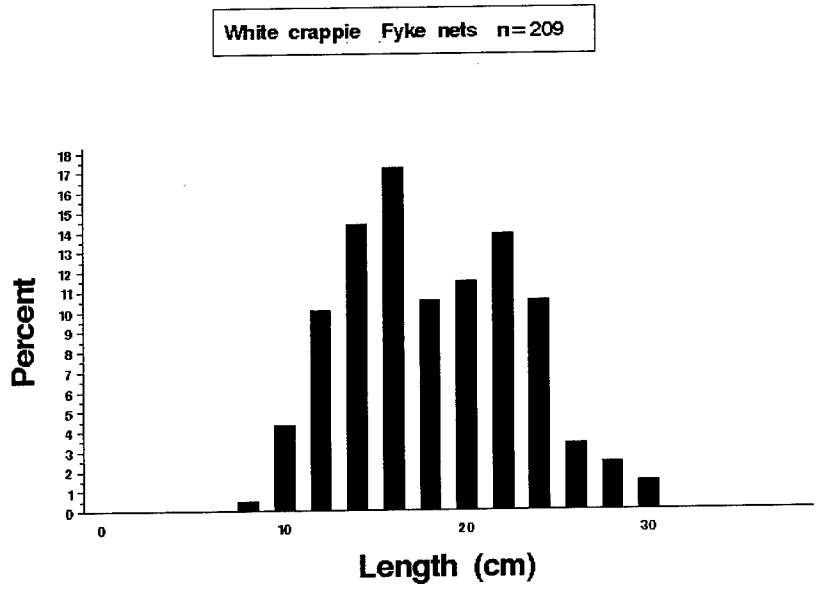

Figure 3.13. Length distributions (*length*) as a percentage of catch (*percent*) for white crappie (*Pomoxis annularus*) collected by fyke netting in Upper Mississippi River Pool 13 during 1992.

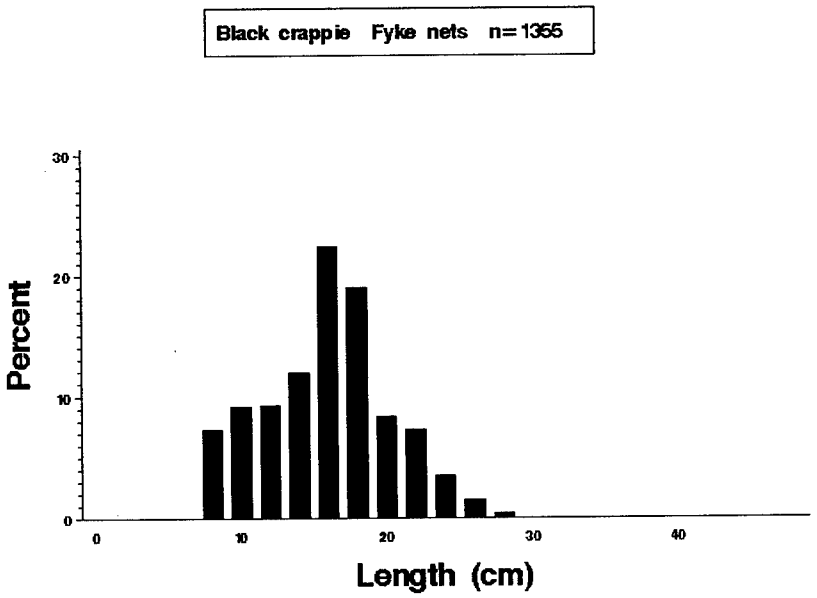

Figure 3.14. Length distributions (*length*) as a percentage of catch (*percent*) for black crappie (*Pomoxis nigromaculatus*) collected by fyke netting in Upper Mississippi River Pool 13 during 1992.

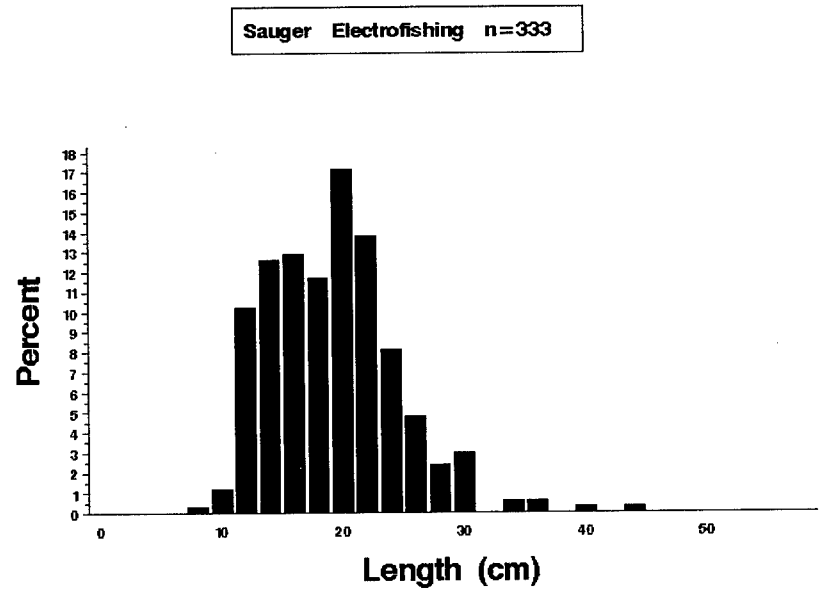

Figure 3.15. Length distributions (*length*) as a percentage of catch (*percent*) for sauger (*Stizostedion canadense*) collected by electrofishing in Upper Mississippi River Pool 13 during 1992.

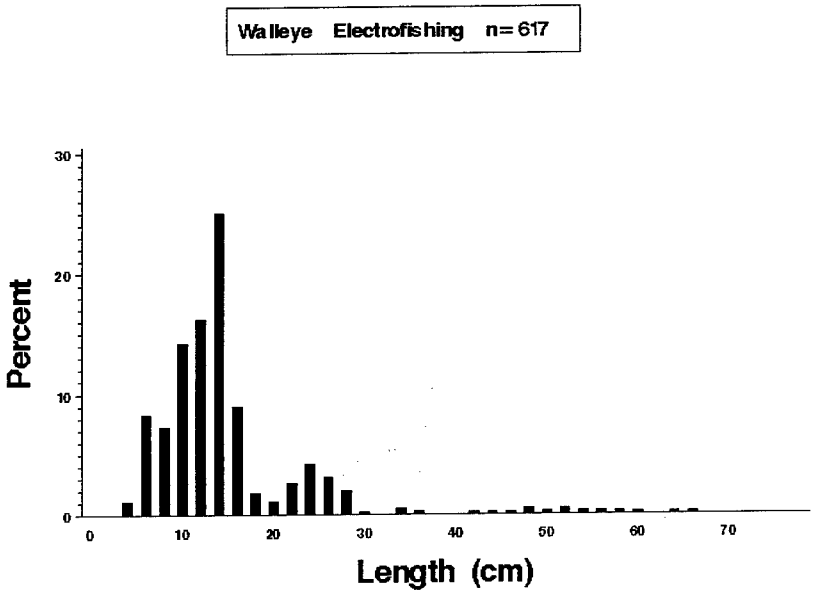

Figure 3.16. Length distributions (*length*) as a percentage of catch (*percent*) for walleye (*Stizostedion vitreum*) collected by electrofishing in Upper Mississippi River Pool 13 during 1992.

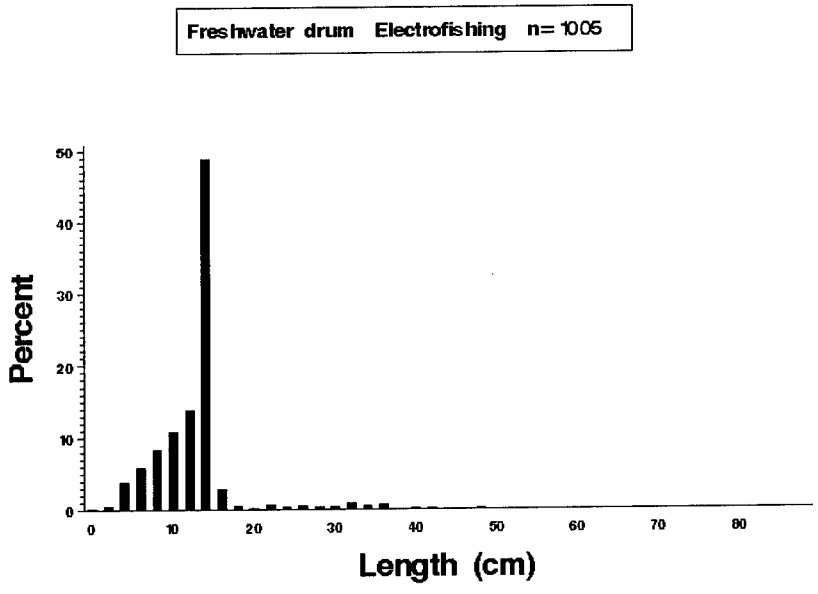

Figure 3.17. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by electrofishing in Upper Mississippi River Pool 13 during 1992.

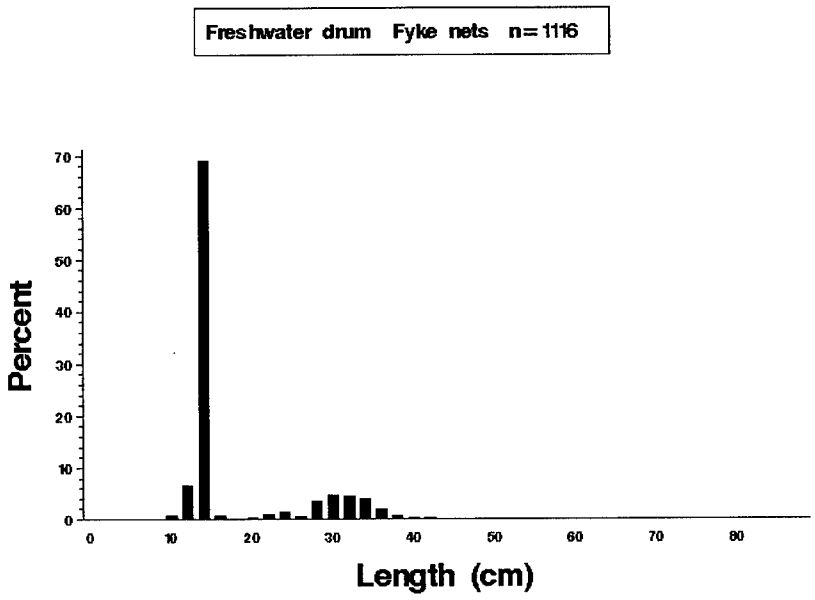

Figure 3.18. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by fyke netting in Upper Mississippi River Pool 13 during 1992.

Chapter 4. Pool 26, Upper Mississippi River

by

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Hydrograph

Water levels at Pool 26 are influenced by discharge from the Mississippi, Illinois, and Missouri Rivers. The pool is regulated at a midpool control point by the U.S. Army Corps of Engineers. These factors combine to give Pool 26 a highly fluctuating hydrologic regime. Three sets of hydrographs are shown to accurately represent these fluctuations (Figure 4.1). Gages are located at Lock and Dam 25 tailwater (Winfield Gage), midpool (Grafton Gage), and Lock and Dam 26 impoundment (Alton Gage). Each graph shows 1940–91 daily means and 1992 daily water levels. The Winfield Gage shows highly fluctuating water levels throughout the year. During the sampling season, daily water levels varied but stayed close to the mean. At the Grafton Gage, daily water levels were more stable and just slightly below the mean. Although water levels at the Alton Gage were stable during the sampling season, significant drawdowns occurred in March, May, and December.

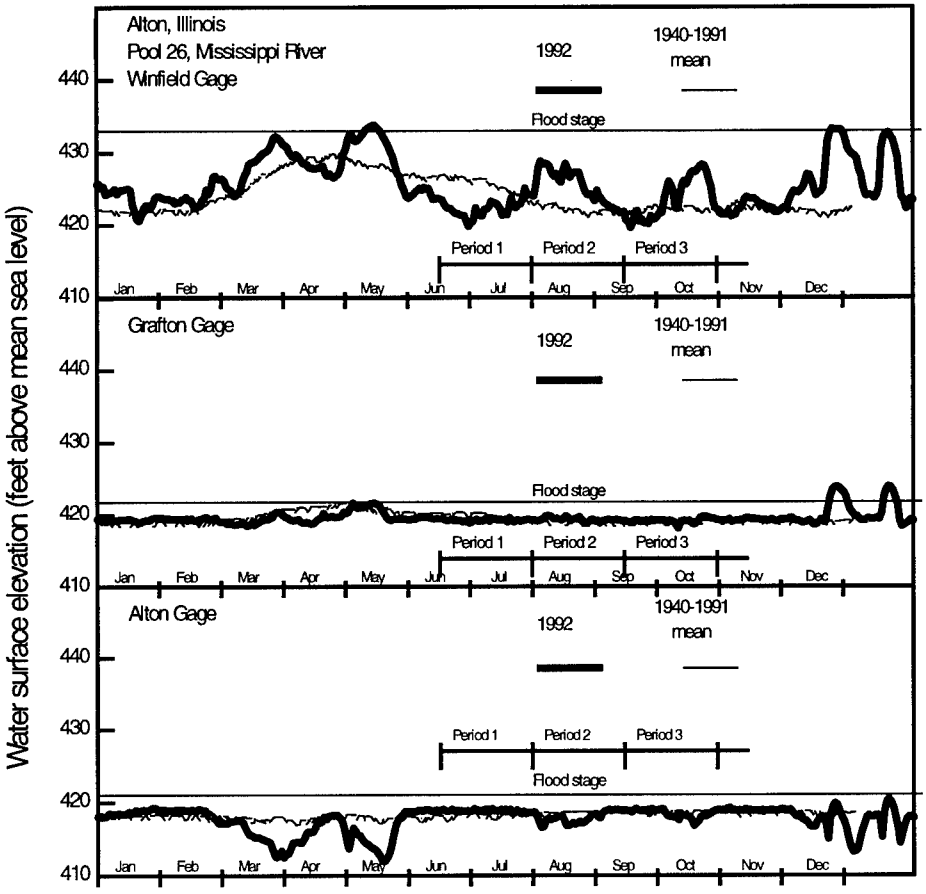

Figure 4.1. Daily water surface elevation from Winfield, Grafton, and Alton Gages for Pool 26, Upper Mississippi River, during 1992 and mean elevation since 1940. Discharge data were obtained from the U.S. Army Corps of Engineers, St. Louis District.

Summary of Sampling Effort

We collected 332 samples from fixed sites using seven gears in 1992 (Table 4.1). We collected 111 samples in the first period, 111 in the second, and 110 in the third. The greatest effort (85 samples) was expended in the BWCS stratum. The least effort (24 samples) was in the SCB stratum.

Total Catch by Gear

We collected 36,458 fish representing 67 species and four hybrids (goldfish × carp, green sunfish × warmouth, green sunfish × orangespotted sunfish, and green sunfish × bluegill) during the 1992 field season (Table 4.2). The five most abundant species were the gizzard shad (15,843), emerald shiner (4,742), bluegill (3,248), smallmouth buffalo (2,045), and freshwater drum (1,304). The total number of fish and species—excluding hybrids—collected by gear type were day electrofishing, 7,558 fish of 50 species; night electrofishing, 5,056 fish of 40 species; fyke netting, 3,388 fish of 35 species; mini fyke netting, 8,352 fish of 44 species; seining, 10,445 fish of 28 species; hoop nets, 1,096 fish of 21 species; and trawling, 563 fish of 16 species. We collected four new species in 1992: blue sucker, white sucker, stonecat, and river darter.

Fixed Sampling, Mean *C/f* by Gear and Stratum

Day Electrofishing

For day electrofishing (Table 4.3.1), gizzard shad had the highest *C/f* in the BWCS stratum (77.62), followed by smallmouth buffalo (14.99) and bluegill (13.28). Bluegill had the highest *C/f* in the IMPS stratum (105.25), followed by gizzard shad (78.37) and green sunfish (39.31). River shiner had the highest *C/f* in the MCBU stratum (15.25), followed by freshwater drum (6.42) and common carp (4.31). Gizzard shad had the highest *C/f* in the MCBW stratum (19.46), followed by emerald shiner (6.61) and common carp (5.69).

Night Electrofishing

For night electrofishing (Table 4.3.2), gizzard shad had the highest *C/f* in the BWCS stratum (82.19), followed by bluegill (11.50) and smallmouth buffalo (7.83). Freshwater drum had the highest *C/f* (23.36) in the MCBU stratum, followed by river carpsucker (12.11) and gizzard shad (7.55). Gizzard shad had the highest *C/f* in the SCB stratum (14.37), followed by common carp (13.84) and freshwater drum (8.21). Gizzard shad also had the highest *C/f* in the TWZ stratum (95.66), followed by river carpsucker (22.01) and white bass (19.28).

Fyke Net

For fyke netting (Table 4.3.3), white bass had the highest *C/f* in the BWCS stratum (22.67), followed by bluegill (16.44) and black crappie (8.05). Bluegill had the highest *C/f* in the IMPS stratum (69.27), followed by gizzard shad (36.94) and black crappie (25.99). Shortnose gar had the highest *C/f* in the TWZ stratum (9.90), followed by bluegill (8.58) and white crappie (8.00).

Mini Fyke Net

For mini fyke netting (Table 4.3.4), the three highest *C/f*s by stratum were BWCS (emerald shiner, 46.95; western mosquitofish, 31.49; bluegill, 13.33), IMPS (gizzard shad, 206.30; smallmouth buffalo, 35.60; bigmouth buffalo, 22.42), MCBW (gizzard shad, 86.79; emerald shiner, 39.22; bluegill, 8.14), and TWZ (emerald shiner, 140.52; red shiner, 10.83; spotfin shiner, 4.02)

Tandem Hoop Nets

For tandem hoop netting (Table 4.3.5), the three highest *C/f*s by stratum were MCBU (channel catfish, 15.32; smallmouth buffalo, 3.76; freshwater drum, 1.35), MCBW (freshwater drum, 1.32; bluegill, 1.07; river carpsucker, 0.69) SCB (smallmouth buffalo, 2.18; common carp, 1.38; channel catfish, 1.33), and TWZ (channel catfish, 8.88; smallmouth buffalo, 6.87; river carpsucker, 2.73).

Seine

For seining (Table 4.3.6), gizzard shad had the highest *C/f* in the BWCS stratum (722.25), followed by emerald shiner (211.50) and smallmouth buffalo (85.63). Gizzard shad also had the highest *C/f* in the MCBU stratum (35.48), followed by emerald shiner (25.04) and river shiner (4.91).

Trawl

For trawling (Table 4.3.7), the highest *C/f*s by stratum were MCBU (freshwater drum, 9.25; channel catfish, 1.29; shovelnose sturgeon, 0.08; speckled chub, 0.08; western sand darter, 0.08) CTR (freshwater drum, 3.31; channel catfish, 1.08; speckled chub, 0.81), and TWZ (shovelnose sturgeon, 3.17; channel catfish, 2.50; freshwater drum, 0.67).

Length Distributions of Selected Species

Length distributions are presented for selected species in Figures 4.2 to 4.15. The length distributions for some gears may be limited by the size selectiveness of the particular gear. Length distributions from small samples ($n < 100$) may be included but are not statistically meaningful (Anderson and Neumann 1996).

Gizzard Shad

The electrofishing length distribution from 4,979 gizzard shad (Figure 4.2) is characterized by two length groups. The first probably represents age 0 fish from 0 to 12 cm, and the second represents larger fish from 14 to 40 cm.

Common Carp

The electrofishing length distribution from 563 common carp (Figure 4.3) shows a mode of 42 cm, a few age 0 fish between 0 and 10 cm, and some larger fish between 50 and 76 cm.

Smallmouth Buffalo

The electrofishing length distribution from 543 smallmouth buffalo (Figure 4.4) is dominated by age 0 fish (mode of 2 cm) and relatively few larger fish. The hoop net length distribution from 228 smallmouth buffalo (Figure 4.5) shows larger fish between 20 and 50 cm, with a mode of 36 cm.

Channel Catfish

The electrofishing length distribution from 235 channel catfish (Figure 4.6) appears bimodal. The first group ranges between 6 and 24 cm with a mode of 14 cm and probably represents age 0 fish. The second group ranges from 28 to 68 cm, with a mode of 38 cm. The hoop net length distribution from 496 channel catfish (Figure 4.7) shows a very strong length group, with a mode of 18 cm and more fish above the mode than below it.

White Bass

The electrofishing length distribution from 337 white bass (Figure 4.8) has a mode of 6 cm and a range between 0 and 40 cm.

Bluegill

The electrofishing length distribution from 1,829 bluegill (Figure 4.9) shows fish ranging from 0 to 18 cm, with a mode of 10 cm. The fyke net length distribution from 1,073 bluegill (Figure 4.10) also shows a mode of 10 cm, with fish ranging from 6 to 20 cm.

Largemouth Bass

The electrofishing length distribution from 373 largemouth bass (Figure 4.11) appears bimodal. The first group of fish are probably age 0, with a mode of 8 cm, and the second group are older fish, with a mode of 28 cm.

White Crappie

The fyke netting length distribution from 130 white crappie (Figure 4.12) also shows a strong unimodal distribution, with a mode of 18 cm.

Black Crappie

The fyke netting length distribution from 474 black crappie (Figure 4.13) shows a strong unimodal distribution, with a mode of 18 cm.

Sauger

The electrofishing length distribution from 121 sauger (Figure 4.14) shows fish ranging from 4 to 48 cm, with no clear length groups.

Freshwater Drum

The electrofishing length distribution from 752 freshwater drum (Figure 4.15) shows fish ranging from 0 to 46 cm, with a mode of 20 cm.

Table 4.1. Allocation of fish sampling effort among strata by the Long Term Resource Monitoring Program in Pool 26 of the Mississippi River during 1992. Table entries are numbers of successfully completed standardized monitoring collections.

Sampling period = 1: June 15 - July 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	CTR	TWZ	TOTAL
Day electrofishing	8			4	4	4				20
Fyke net	8					3			1	12
Tandem hoop net			4	4	4				2	14
Mini fyke net	4				4	4			2	14
Night electrofishing	6		4	4					2	16
Seine	4			7						11
Trawling				8				12	4	24
SUBTOTAL	30	0	8	27	12	11	0	12	11	111

Sampling period = 2: August 1 - September 14

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	CTR	TWZ	TOTAL
Day electrofishing	8			4	4	4				20
Fyke net	8					4			2	14
Tandem hoop net			4	4	4				2	14
Mini fyke net	6				3	4			2	15
Night electrofishing	4		4	4					2	14
Seine	2			8						10
Trawling				8				12	4	24
SUBTOTAL	28	0	8	28	11	12	0	12	12	111

Sampling period = 3: September 15 - October 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	CTR	TWZ	TOTAL
Day electrofishing	5			4	4	4				17
Fyke net	8					3			2	13
Tandem hoop net			4	4	4				2	14
Mini fyke net	6				4	4			2	16
Night electrofishing	6		4	4					2	16
Seine	2			8						10
Trawling				8				12	4	24
SUBTOTAL	27	0	8	28	12	11	0	12	12	110
	85	0	24	83	35	34	0	36	35	332

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
CTR - Main channel trough.
TWZ - Tailwater.

Table 4.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1992 in Pool 26 of the Mississippi River. See Table 4.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	H	T	TOTAL
1	Chestnut lamprey	Ichthyomyzon castaneus	-	1	-	-	-	-	-	-	-	1
2	Lake sturgeon	Acipenser fulvescens	-	-	-	-	-	-	-	-	1	1
3	Shovelnose sturgeon	Scaphirhynchus platorynchus	-	-	-	-	-	-	-	-	56	56
4	Spotted gar	Lepisosteus oculatus	3	1	11	-	-	-	-	-	-	15
5	Longnose gar	Lepisosteus osseus	5	12	4	-	1	-	-	1	-	23
6	Shortnose gar	Lepisosteus platostomus	49	182	232	-	39	-	1	3	-	506
7	Bowfin	Amia calva	-	-	2	-	-	-	-	-	-	2
8	Goldeye	Hiodon alosoides	-	1	-	-	-	-	-	1	-	2
9	Mooneye	Hiodon tergisus	13	16	1	-	-	-	1	1	1	33
10	American eel	Anguilla rostrata	1	-	-	-	-	-	-	3	-	4
11	Skipjack herring	Alosa chrysochloris	98	2	5	-	9	-	-	1	-	115
12	Gizzard shad	Dorosoma cepedianum	2827	2152	514	-	3722	-	6594	31	3	15843
13	Threadfin shad	Dorosoma petenense	45	-	4	-	2	-	-	-	-	51
14	Goldfish	Carassius auratus	1	-	2	-	-	-	-	-	-	3
15	Grass carp	Ctenopharyngodon idella	-	2	-	-	1	-	-	-	-	3
16	Red shiner	Cyprinella lutrensis	32	7	-	-	89	-	30	-	-	158
17	Spotfin shiner	Cyprinella spiloptera	15	2	-	-	32	-	11	-	-	60
18	Common carp	Cyprinus carpio	227	336	30	-	24	-	3	55	1	676
19	Goldfish x carp	Carassius auratus x C. carpio	-	-	-	-	-	-	-	2	-	2
20	Bighead carp	Hypopthalmichthys nobilis	-	-	1	-	-	-	-	-	-	1
21	Speckled chub	Macrhybopsis aestivalis	-	-	-	-	-	-	13	-	36	49
22	Silver chub	Macrhybopsis storeriana	14	21	-	-	10	-	8	1	1	55
23	Golden shiner	Notemigonus crysoleucas	3	-	-	-	3	-	-	-	-	6
24	Emerald shiner	Notropis atherinoides	273	168	-	-	2033	-	2268	-	-	4742
25	River shiner	Notropis blennius	205	13	-	-	51	-	155	-	2	426
26	Ghost shiner	Notropis buchanani	-	-	-	-	2	-	-	-	-	2
27	Silverband shiner	Notropis shumardi	-	-	-	-	2	-	-	-	-	2
28	Sand shiner	Notropis stramineus	1	-	-	-	6	-	3	-	-	10
29	Channel shiner	Notropis wickliffi	2	9	-	-	4	-	16	-	-	31
30	Suckermouth minnow	Phenacobius mirabilis	-	-	-	-	-	-	3	-	-	3
31	Bluntnose minnow	Pimephales notatus	4	-	-	-	4	-	1	-	-	9
32	Bullhead minnow	Pimephales vigilax	86	45	1	-	237	-	19	-	-	388
33	River carpsucker	Carpiodes carpio	76	383	92	-	2	-	447	53	4	1057
34	Quillback	Carpiodes cyprinus	2	16	2	-	-	-	-	3	-	23
35	White sucker	Catostomus commersoni	-	1	-	-	-	-	-	-	-	1
36	Blue sucker	Cycleptus elongatus	1	-	-	-	-	-	-	-	-	1
37	Smallmouth buffalo	Ictiobus bubalus	392	151	25	-	493	-	754	228	2	2045
38	Bigmouth buffalo	Ictiobus cyprinellus	50	22	5	-	275	-	4	1	-	357
39	Black buffalo	Ictiobus niger	1	13	2	-	-	-	-	4	-	20
40	Golden redhorse	Moxostoma erythrurum	-	1	-	-	1	-	-	-	-	2

Gears: D - Day electrofishing
N - Night electrofishing
F - Fyke netting
M - Mini fyke netting
T - Trawling (4.8-m bottom trawl)
S - Seining
H - Tandem hoop netting
X - Tandem fyke netting
Y - Tandem min fyke netting

Table 4.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1992 in Pool 26 of the Mississippi River. See Table 4.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	H	T	TOTAL
41	Shorthead redhorse	Moxostoma macrolepidotum	9	31	6	-	1	-	1	-	2	50
42	Black bullhead	Ameiurus melas	-	-	3	-	2	-	-	-	-	5
43	Yellow bullhead	Ameiurus natalis	28	-	1	-	4	-	-	-	-	33
44	Brown bullhead	Ameiurus nebulosus	1	-	1	-	-	-	-	-	-	2
45	Blue catfish	Ictalurus furcatus	1	-	-	-	-	-	-	-	1	2
46	Channel catfish	Ictalurus punctatus	99	136	20	-	5	-	3	496	100	859
47	Stonecat	Noturus flavus	1	-	-	-	-	-	-	-	-	1
48	Tadpole madtom	Noturus gyrinus	-	-	-	-	2	-	-	-	-	2
49	Flathead catfish	Pylodictis olivaris	50	26	1	-	1	-	-	11	2	91
50	Western mosquitofish	Gambusia affinis	2	4	-	-	508	-	15	-	-	529
51	Brook silverside	Labidesthes sicculus	1	-	-	-	-	-	-	-	-	1
52	White bass	Morone chrysops	90	247	605	-	173	-	55	26	-	1196
53	Yellow bass	Morone mississippiensis	2	30	27	-	3	-	-	-	-	62
54	Green sunfish	Lepomis cyanellus	470	1	5	-	1	-	-	-	-	477
55	Warmouth	Lepomis gulosus	19	-	7	-	9	-	-	-	-	35
56	Orangespotted sunfish	Lepomis humilis	111	36	27	-	49	-	-	-	-	223
57	Bluegill	Lepomis macrochirus	1570	259	1073	-	313	-	4	29	-	3248
58	Green sunfish x warmouth	L. cyanellus x L. gulosus	1	-	-	-	-	-	-	-	-	1
59	Green x orangespotted sunfish	L. cyanellus x L. humilis	1	-	-	-	-	-	-	-	-	1
60	Green sunfish x bluegill	L. cyanellus x L. macrochirus	15	-	2	-	-	-	-	-	-	17
61	Smallmouth bass	Micropterus dolomieu	2	-	-	-	-	-	-	-	-	2
62	Largemouth bass	Micropterus salmoides	341	32	22	-	103	-	-	-	-	498
63	White crappie	Pomoxis annularis	18	15	130	-	10	-	1	14	-	188
64	Black crappie	Pomoxis nigromaculatus	60	25	475	-	52	-	-	18	-	630
65	Western sand darter	Ammocrypta clara	-	1	-	-	-	-	22	-	2	25
66	Logperch	Percina caprodes	1	-	-	-	3	-	-	-	-	4
67	Slenderhead darter	Percina phoxocephala	1	-	-	-	-	-	-	-	-	1
68	River darter	Percina shumardi	-	-	-	-	22	-	-	-	-	22
69	Sauger	Stizostedion canadense	40	82	6	-	8	-	4	-	-	140
70	Walleye	Stizostedion vitreum	13	7	3	-	1	-	1	-	-	25
71	Freshwater drum	Aplodinotus grunniens	185	567	41	-	40	-	8	114	349	1304
			7558	5056	3388	0	8352	0	10445	1096	563	36458

Gears: D - Day electrofishing
N - Night electrofishing
F - Fyke netting
M - Mini fyke netting
T - Trawling (4.8-m bottom trawl)
S - Seining
H - Tandem hoop netting
X - Tandem fyke netting
Y - Tandem min fyke netting

Table 4.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by day electrofishing in Pool 26 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Spotted gar		0.08		0.08						
		(0.08)		(0.08)						
Longnose gar		0.14			0.08	0.10				
		(0.08)			(0.08)	(0.10)				
Shortnose gar		1.50		0.08	0.50	0.70				
		(0.47)		(0.08)	(0.26)	(0.25)				
Mooneye		0.14				0.56				
		(0.10)				(0.31)				
American eel						0.06				
						(0.06)				
Skipjack herring		2.54		3.58	0.08					
		(0.94)		(1.91)	(0.08)					
Gizzard shad		77.62		78.37	1.08	19.46				
		(24.31)		(24.83)	(0.40)	(4.22)				
Threadfin shad		0.57		2.76						
		(0.38)		(1.53)						
Goldfish		0.05								
		(0.05)								
Red shiner		1.35		0.08		0.16				
		(0.86)		(0.08)		(0.12)				
Spotfin shiner		0.05		0.08	0.58	0.45				
		(0.05)		(0.08)	(0.43)	(0.19)				
Common carp		2.68		2.73	4.31	5.69				
		(0.97)		(0.55)	(1.23)	(1.01)				
Silver chub		0.19		0.33	0.52					
		(0.11)		(0.33)	(0.27)					
Golden shiner				0.24						
				(0.13)						
Emerald shiner		7.38		0.83	0.83	6.61				
		(4.19)		(0.41)	(0.42)	(3.26)				
River shiner		2.01		0.25	15.25	0.61				
		(1.16)		(0.18)	(13.17)	(0.26)				
Sand shiner		0.05								
		(0.05)								
Channel shiner		0.05			0.08					
		(0.05)			(0.08)					
Bluntnose minnow		0.10		0.08		0.11				
		(0.07)		(0.08)		(0.11)				
Bullhead minnow		2.52		2.58		0.17				
		(0.90)		(1.02)		(0.12)				
River carpsucker		1.92		0.42	2.35	0.21				
		(0.82)		(0.26)	(0.99)	(0.17)				
Quillback					0.08	0.06				
					(0.08)	(0.06)				
Blue sucker						0.10				
						(0.10)				
Smallmouth buffalo		14.99		4.33	0.98	0.99				
		(6.22)		(2.05)	(0.73)	(0.30)				
Bigmouth buffalo		1.41		0.42	0.08	0.65				
		(1.22)		(0.15)	(0.08)	(0.51)				
Black buffalo					0.08					
					(0.08)					
Shorthead redhorse		0.05		0.42	0.08	0.15				
		(0.05)		(0.34)	(0.08)	(0.15)				
Yellow bullhead				2.31						
				(0.97)						
Brown bullhead				0.08						
				(0.08)						
Blue catfish					0.08					
					(0.08)					

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CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 4.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by day electrofishing in Pool 26 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Channel catfish		1.04			2.85	2.78				
		(0.72)			(0.89)	(0.75)				
Stonecat						0.04				
						(0.04)				
Flathead catfish					0.44	2.79				
					(0.20)	(0.73)				
Western mosquitofish		0.05		0.08						
		(0.05)		(0.08)						
Brook silverside						0.10				
						(0.10)				
White bass		1.32		2.35	0.83	1.55				
		(0.35)		(1.14)	(0.41)	(0.42)				
Yellow bass		0.10								
		(0.10)								
Green sunfish				39.31		0.46				
				(12.33)		(0.22)				
Warmouth				1.59						
				(0.74)						
Orangespotted sunfish		0.65		8.00		0.10				
		(0.20)		(5.17)		(0.10)				
Bluegill		13.28		105.25	0.25	2.36				
		(3.50)		(26.05)	(0.13)	(0.79)				
Green x warmouth sunfish				0.10						
				(0.10)						
Green x orangespotted sunfish				0.08						
				(0.08)						
Green sunfish x bluegill		0.05		1.18						
		(0.05)		(0.43)						
Smallmouth bass						0.16				
						(0.11)				
Largemouth bass		1.48		24.52	0.17	1.29				
		(0.38)		(4.99)	(0.11)	(0.47)				
White crappie		0.73		0.08		0.10				
		(0.34)		(0.08)		(0.07)				
Black crappie		0.62		3.27	0.33	0.24				
		(0.28)		(1.45)	(0.33)	(0.24)				
Logperch		0.05								
		(0.05)								
Slenderhead darter		0.04								
		(0.04)								
Sauger		1.33		0.17	0.94					
		(0.48)		(0.11)	(0.55)					
Walleye		0.38		0.33	0.08					
		(0.16)		(0.19)	(0.08)					
Freshwater drum		2.80		0.17	6.42	3.70				
		(1.64)		(0.17)	(3.30)	(1.97)				

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CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 4.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by night electrofishing in Pool 26 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Chestnut lamprey					0.08					
					(0.08)					
Spotted gar		0.06								
		(0.06)								
Longnose gar		0.44			0.17		0.08			0.33
		(0.44)			(0.11)		(0.08)			(0.21)
Shortnose gar		4.50			1.59		2.97			9.97
		(1.78)			(0.63)		(1.12)			(4.09)
Goldeye		0.06								
		(0.06)								
Mooneye		0.31			0.41		0.50			
		(0.31)			(0.28)		(0.29)			
Skipjack herring		0.11								
		(0.08)								
Gizzard shad		82.19			7.55		14.37			95.66
		(19.52)			(2.57)		(5.45)			(45.24)
Grass carp		0.12								
		(0.08)								
Red shiner		0.31			0.08					0.18
		(0.31)			(0.08)					(0.18)
Spotfin shiner							0.17			
							(0.11)			
Common carp		3.78			4.49		13.84			8.81
		(1.01)			(1.64)		(2.81)			(3.45)
Silver chub		0.56			0.74		0.08			0.36
		(0.32)			(0.41)		(0.08)			(0.36)
Emerald shiner		3.83			2.81		3.96			4.35
		(1.51)			(1.42)		(1.04)			(2.78)
River shiner		0.31			0.46		0.08			0.35
		(0.20)			(0.23)		(0.08)			(0.22)
Channel shiner					0.50		0.08			0.36
					(0.50)		(0.08)			(0.36)
Bullhead minnow		1.91			0.57		0.56			
		(0.88)			(0.25)		(0.34)			
River carpsucker		5.34			12.11		1.86			22.01
		(3.03)			(4.44)		(0.84)			(14.65)
Quillback		0.56			0.24					0.67
		(0.35)			(0.17)					(0.67)
White sucker		0.06								
		(0.06)								
Smallmouth buffalo		7.83			0.49		0.25			1.89
		(3.00)			(0.23)		(0.18)			(1.48)
Bigmouth buffalo		0.71			0.17		0.42			0.54
		(0.20)			(0.11)		(0.42)			(0.54)
Black buffalo		0.31			0.25		0.31			0.18
		(0.15)			(0.25)		(0.31)			(0.18)
Golden redhorse		0.06								
		(0.06)								
Shorthead redhorse		1.25			0.41		0.41			0.18
		(0.77)			(0.15)		(0.26)			(0.18)
Channel catfish		1.11			5.80		3.15			1.51
		(0.39)			(1.46)		(0.78)			(0.76)
Flathead catfish		0.31			1.01		0.57			0.55
		(0.25)			(0.45)		(0.28)			(0.39)
Western mosquitofish		0.25								
		(0.14)								
White bass		4.70			2.08		2.70			19.28
		(1.92)			(0.62)		(0.62)			(5.53)
Yellow bass		0.31			0.08		0.25			3.55
		(0.15)			(0.08)		(0.18)			(1.68)

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Table 4.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by night electrofishing in Pool 26 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error. Table page: 2

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Green sunfish		0.06								
		(0.06)								
Orangespotted sunfish		2.12					0.08			
		(1.01)					(0.08)			
Bluegill		11.50			0.60		0.48			9.37
		(4.89)			(0.34)		(0.28)			(4.16)
Largemouth bass		1.46			0.08					1.04
		(0.61)			(0.08)					(0.55)
White crappie		0.41								1.36
		(0.17)								(0.62)
Black crappie		0.60					0.56			1.37
		(0.26)					(0.35)			(0.76)
Western sand darter					0.08					
					(0.08)					
Sauger		1.86			2.08		0.91			2.51
		(0.48)			(0.59)		(0.33)			(1.28)
Walleye		0.06			0.16					0.67
		(0.06)			(0.11)					(0.67)
Freshwater drum		5.88			23.36		8.21			16.26
		(1.53)			(6.54)		(2.67)			(5.29)

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Table 4.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by fyke netting in Pool 26 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Spotted gar		0.32		0.29						
		(0.17)		(0.21)						
Longnose gar		0.05		0.09						0.38
		(0.05)		(0.09)						(0.38)
Shortnose gar		7.32		1.49						9.90
		(1.66)		(0.57)						(5.50)
Bowfin		0.09								
		(0.06)								
Mooneye				0.10						
				(0.10)						
Skipjack herring		0.21								
		(0.10)								
Gizzard shad		4.99		36.94						6.09
		(1.56)		(27.90)						(4.65)
Threadfin shad		0.17								
		(0.10)								
Goldfish		0.04		0.10						
		(0.04)		(0.10)						
Common carp		0.63		1.48						
		(0.25)		(0.77)						
Bighead carp		0.05								
		(0.05)								
Bullhead minnow				0.09						
				(0.09)						
River carpsucker		3.48		1.45						0.20
		(1.46)		(0.99)						(0.20)
Quillback		0.09								
		(0.09)								
Smallmouth buffalo		0.79		0.64						
		(0.43)		(0.28)						
Bigmouth buffalo		0.21								
		(0.14)								
Black buffalo		0.09								
		(0.09)								
Shorthead redhorse		0.25								
		(0.15)								
Black bullhead		0.04		0.20						
		(0.04)		(0.13)						
Yellow bullhead				0.09						
				(0.09)						
Brown bullhead				0.09						
				(0.09)						
Channel catfish		0.62		0.55						0.20
		(0.18)		(0.30)						(0.20)
Flathead catfish										0.19
										(0.19)
White bass		22.67		3.26						4.76
		(6.94)		(1.98)						(2.70)
Yellow bass		0.95								1.00
		(0.36)								(0.77)
Green sunfish				0.54						
				(0.38)						
Warmouth				0.67						
				(0.47)						
Orangespotted sunfish		0.17		2.44						
		(0.08)		(1.19)						
Bluegill		16.44		69.27						8.58
		(5.51)		(33.94)						(3.04)
Green sunfish x bluegill				0.24						
				(0.24)						

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Table 4.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by fyke netting in Pool 26 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Largemouth bass		0.63		0.51						0.40
		(0.21)		(0.22)						(0.40)
White crappie		2.64		2.82						8.00
		(0.67)		(1.95)						(2.51)
Black crappie		8.05		25.99						7.02
		(2.97)		(9.87)						(2.96)
Sauger		0.22								0.20
		(0.11)								(0.20)
Walleye		0.13								
		(0.09)								
Freshwater drum		1.68		0.20						0.20
		(0.79)		(0.20)						(0.20)

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Table 4.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by mini fyke netting in Pool 26 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Longnose gar		0.07								
		(0.07)								
Shortnose gar		1.52		0.24		0.66				0.97
		(0.59)		(0.17)		(0.25)				(0.50)
Skipjack herring		0.50		0.08						
		(0.34)		(0.08)						
Gizzard shad		12.69		206.30		86.79				2.25
		(7.56)		(144.83)		(55.84)				(1.70)
Threadfin shad						0.20				
						(0.20)				
Grass carp										0.16
										(0.16)
Red shiner		0.43		0.34		1.18				10.83
		(0.43)		(0.26)		(0.72)				(6.66)
Spotfin shiner		0.27		0.25						4.02
		(0.27)		(0.25)						(2.95)
Common carp		0.39		1.39						
		(0.27)		(1.31)						
Silver chub				0.55		0.29				0.17
				(0.46)		(0.15)				(0.17)
Golden shiner				0.25						
				(0.13)						
Emerald shiner		46.95		2.91		39.22				140.52
		(25.25)		(1.38)		(17.12)				(80.17)
River shiner		0.13		2.49		0.38				2.93
		(0.09)		(1.62)		(0.16)				(0.76)
Ghost shiner		0.14								
		(0.14)								
Silverband shiner						0.19				
						(0.13)				
Sand shiner				0.41						0.16
				(0.41)						(0.16)
Channel shiner		0.07								0.48
		(0.07)								(0.33)
Bluntnose minnow		0.07		0.18		0.09				
		(0.07)		(0.12)		(0.09)				
Bullhead minnow		9.93		4.89		2.18				1.49
		(5.40)		(2.16)		(1.15)				(1.49)
River carpsucker		0.07								0.16
		(0.07)								(0.16)
Smallmouth buffalo		0.11		35.60		5.04				0.33
		(0.11)		(21.87)		(3.48)				(0.33)
Bigmouth buffalo				22.42		0.09				
				(15.43)		(0.09)				
Golden redhorse				0.08						
				(0.08)						
Shorthead redhorse						0.09				
						(0.09)				
Black bullhead		0.06		0.09						
		(0.06)		(0.09)						
Yellow bullhead				0.33						
				(0.14)						
Channel catfish		0.07		0.08		0.27				
		(0.07)		(0.08)		(0.14)				
Tadpole madtom				0.17						
				(0.11)						
Flathead catfish										0.16
										(0.16)
Western mosquitofish		31.49		1.07		0.09				3.58
		(20.54)		(0.53)		(0.09)				(1.30)

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TRI - Tributary mouth
TWZ - Tailwater

Table 4.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by mini fyke netting in Pool 26 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
White bass		1.95		7.04		3.11				3.71
		(0.79)		(3.05)		(1.42)				(0.83)
Yellow bass		0.07								0.32
		(0.07)								(0.20)
Green sunfish		0.07								
		(0.07)								
Warmouth		0.06		0.64						
		(0.06)		(0.30)						
Orangespotted sunfish		0.92		2.79						
		(0.56)		(1.36)						
Bluegill		13.33		0.95		8.14				1.64
		(7.46)		(0.27)		(3.92)				(1.28)
Largemouth bass		0.18		8.08		0.09				
		(0.13)		(4.96)		(0.09)				
White crappie		0.36				0.29				0.16
		(0.17)				(0.21)				(0.16)
Black crappie		2.29		0.76		0.38				
		(1.43)		(0.52)		(0.16)				
Logperch		0.12				0.09				
		(0.08)				(0.09)				
River darter				0.08		1.23				1.30
				(0.08)		(0.96)				(0.94)
Sauger		0.13		0.25		0.18				0.16
		(0.09)		(0.13)		(0.12)				(0.16)
Walleye				0.09						
				(0.09)						
Freshwater drum		1.14				2.05				0.16
		(0.58)				(0.72)				(0.16)

Strata: BWCS - Backwater, contiguous, shoreline
BWCO - Backwater, contiguous, offshore
IMPS - Impounded, shoreline
IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 4.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by tandem hoop netting in Pool 26 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Longnose gar						0.04 (0.04)				
Shortnose gar						0.13 (0.09)				
Goldeye						0.04 (0.04)				
Mooneye										0.08 (0.08)
American eel						0.04 (0.04)	0.04 (0.04)			0.09 (0.09)
Skipjack herring										0.09 (0.09)
Gizzard shad						0.65 (0.24)				1.41 (0.78)
Common carp						0.34 (0.18)	1.38 (0.62)			1.18 (0.69)
Goldfish x carp						0.04 (0.04)	0.04 (0.04)			
Silver chub					0.04 (0.04)					
River carpsucker					0.09 (0.06)	0.69 (0.29)	0.17 (0.10)			2.73 (2.03)
Quillback										0.26 (0.18)
Smallmouth buffalo					3.76 (0.88)	0.39 (0.26)	2.18 (0.81)			6.87 (3.06)
Bigmouth buffalo							0.04 (0.04)			
Black buffalo					0.04 (0.04)	0.04 (0.04)	0.04 (0.04)			0.09 (0.09)
Channel catfish					15.32 (4.79)	0.33 (0.11)	1.33 (0.58)			8.88 (3.09)
Flathead catfish					0.04 (0.04)	0.04 (0.04)	0.13 (0.07)			0.53 (0.19)
White bass					0.25 (0.14)	0.34 (0.15)	0.13 (0.09)			0.79 (0.43)
Bluegill					0.04 (0.04)	1.07 (0.60)	0.08 (0.06)			
White crappie					0.04 (0.04)	0.51 (0.28)	0.04 (0.04)			
Black crappie					0.05 (0.05)	0.67 (0.29)				0.09 (0.09)
Freshwater drum					1.35 (0.39)	1.32 (0.51)	0.95 (0.31)			2.37 (1.32)

Strata: BWCS - Backwater, contiguous, shoreline
BWCO - Backwater, contiguous, offshore
IMPS - Impounded, shoreline
IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 4.3.6. Mean catch-per-unit-effort and (standard error) for fishes collected by seining in Pool 26 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Shortnose gar					0.04					
					(0.04)					
Mooneye					0.04					
					(0.04)					
Gizzard shad		722.25			35.48					
		(465.99)			(22.51)					
Red shiner		2.25			0.52					
		(1.11)			(0.23)					
Spotfin shiner		0.63			0.26					
		(0.63)			(0.16)					
Common carp		0.38								
		(0.26)								
Speckled chub					0.57					
					(0.23)					
Silver chub		1.00								
		(0.87)								
Emerald shiner		211.50			25.04					
		(78.16)			(7.43)					
River shiner		5.25			4.91					
		(1.25)			(1.11)					
Sand shiner					0.13					
					(0.13)					
Channel shiner		1.75			0.09					
		(0.98)			(0.06)					
Suckermouth minnow					0.13					
					(0.07)					
Bluntnose minnow					0.04					
					(0.04)					
Bullhead minnow		0.88			0.52					
		(0.48)			(0.30)					
River carpsucker		52.63			1.13					
		(18.28)			(0.54)					
Smallmouth buffalo		85.63			3.00					
		(53.20)			(1.22)					
Bigmouth buffalo		0.25			0.09					
		(0.25)			(0.06)					
Shorthead redhorse		0.13								
		(0.13)								
Channel catfish					0.13					
					(0.10)					
Western mosquitofish		1.88								
		(1.19)								
White bass		3.75			1.09					
		(2.44)			(0.69)					
Bluegill					0.17					
					(0.14)					
White crappie					0.04					
					(0.04)					
Western sand darter		0.38			0.83					
		(0.26)			(0.58)					
Sauger		0.13			0.13					
		(0.13)			(0.10)					
Walleye					0.04					
					(0.04)					
Freshwater drum		0.38			0.22					
		(0.38)			(0.11)					

Strata: BWCS - Backwater, contiguous, shoreline
BWCO - Backwater, contiguous, offshore
IMPS - Impounded, shoreline
IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 4.3.7. Mean catch-per-unit-effort and (standard error) for fishes collected by bottom trawling in Pool 26 of the Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Lake sturgeon										0.08 (0.08)
Shovelnose sturgeon					0.08 (0.08)			0.44 (0.17)		3.17 (1.21)
Mooneye					0.04 (0.04)					
Gizzard shad					0.04 (0.04)					0.17 (0.17)
Common carp								0.03 (0.03)		
Speckled chub					0.08 (0.06)			0.81 (0.34)		0.42 (0.19)
Silver chub					0.04 (0.04)					
River shiner								0.06 (0.04)		
River carpsucker					0.04 (0.04)					0.25 (0.25)
Smallmouth buffalo					0.04 (0.04)			0.03 (0.03)		
Shorthead redhorse								0.03 (0.03)		0.08 (0.08)
Blue catfish								0.03 (0.03)		
Channel catfish					1.29 (0.37)			1.08 (0.27)		2.50 (0.93)
Flathead catfish					0.04 (0.04)			0.03 (0.03)		
Western sand darter					0.08 (0.06)					
Freshwater drum					9.25 (4.08)			3.31 (0.72)		0.67 (0.28)

Strata: BWCS - Backwater, contiguous, shoreline
BWCO - Backwater, contiguous, offshore
IMPS - Impounded, shoreline
IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

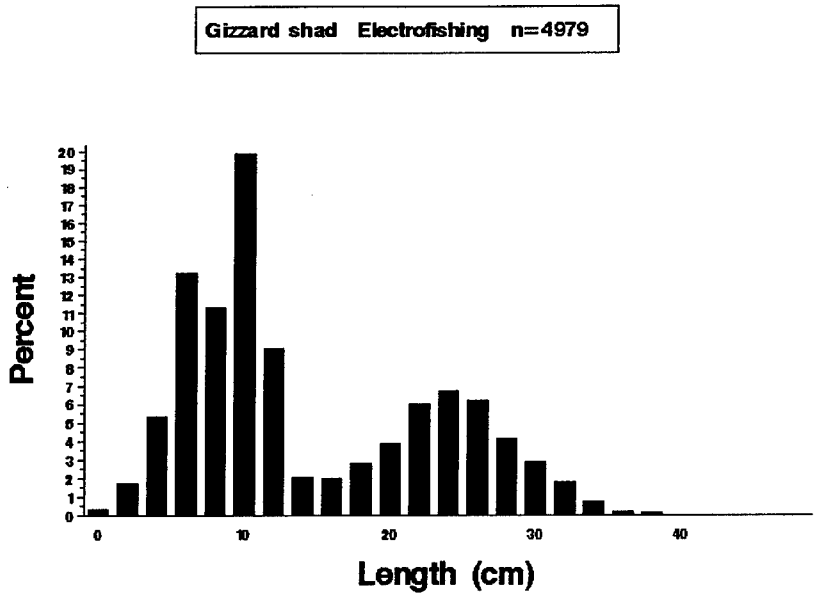

Figure 4.2. Length distributions (*length*) as a percentage of catch (*percent*) for gizzard shad (*Dorosoma cepedianum*) collected by electrofishing in Upper Mississippi River Pool 26 during 1992.

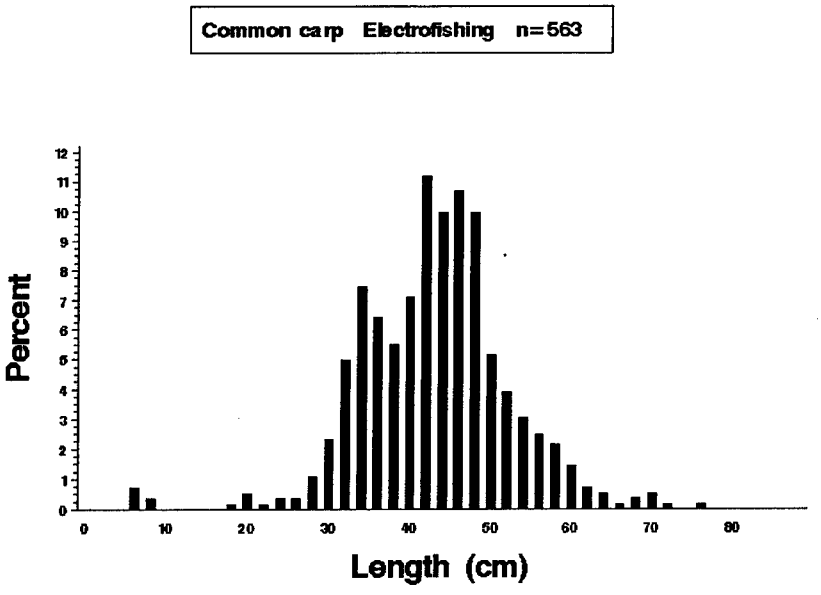

Figure 4.3. Length distributions (*length*) as a percentage of catch (*percent*) for common carp (*Cyprinus carpio*) collected by electrofishing in Upper Mississippi River Pool 26 during 1992.

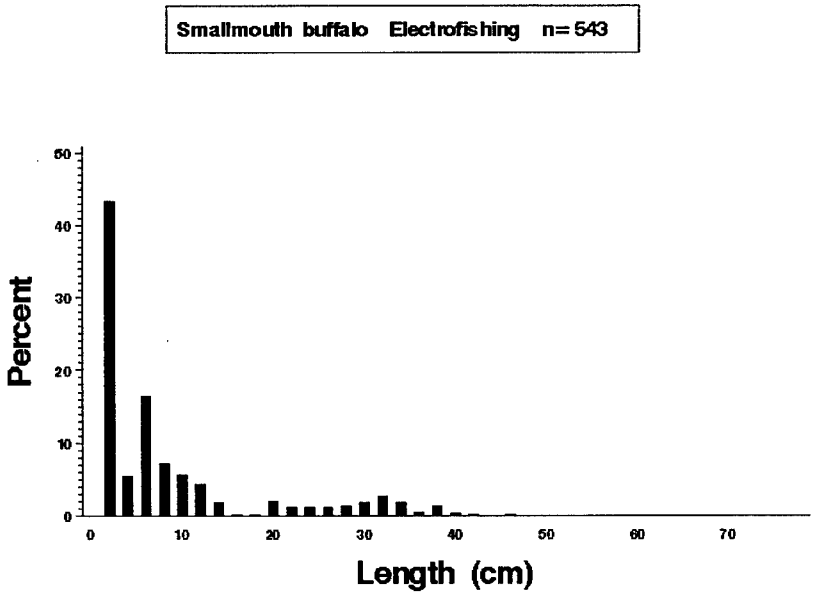

Figure 4.4. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by electrofishing in Upper Mississippi River Pool 26 during 1992.

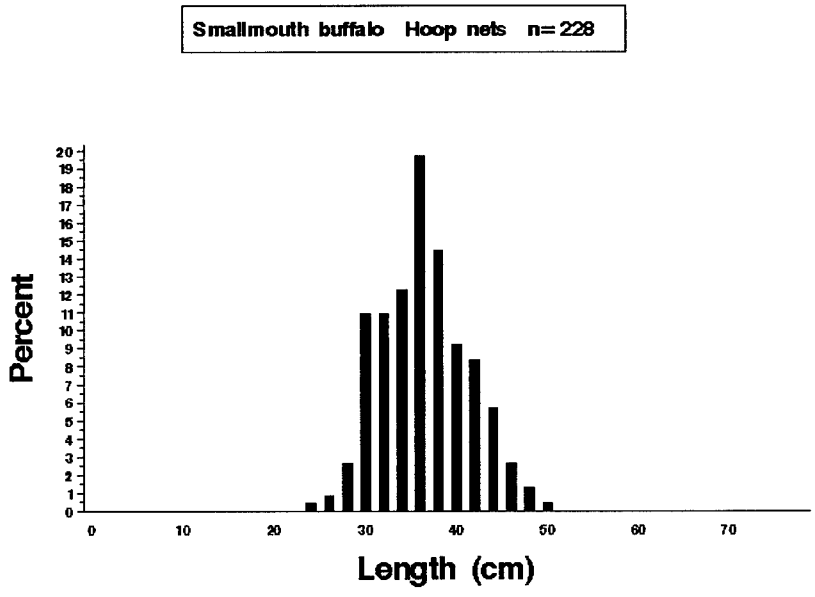

Figure 4.5. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by large and small hoop netting in Upper Mississippi River Pool 26 during 1992.

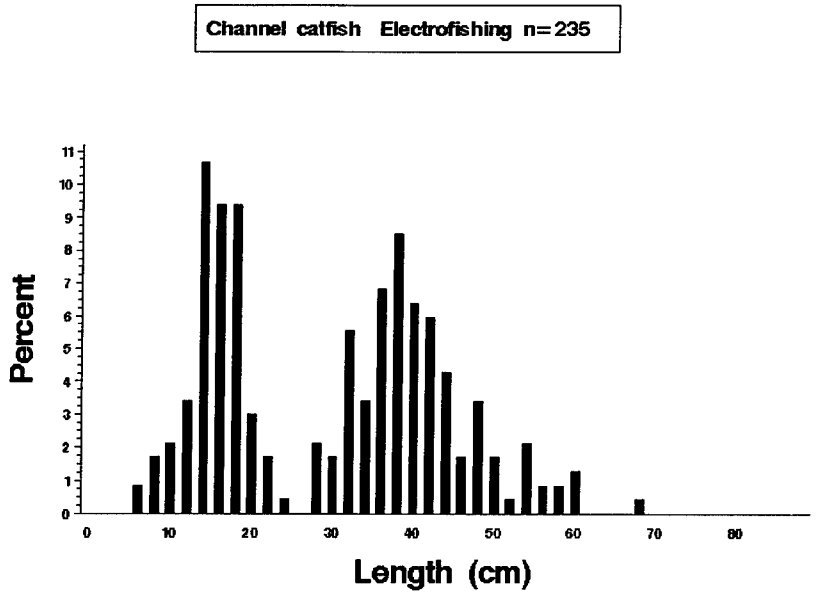

Figure 4.6. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by electrofishing in Upper Mississippi River Pool 26 during 1992.

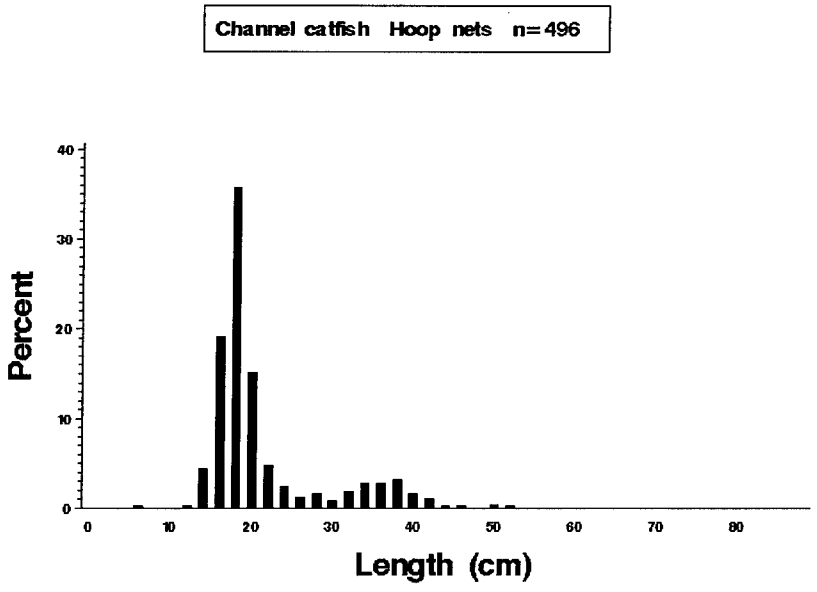

Figure 4.7. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by large and small hoop netting in Upper Mississippi River Pool 26 during 1992.

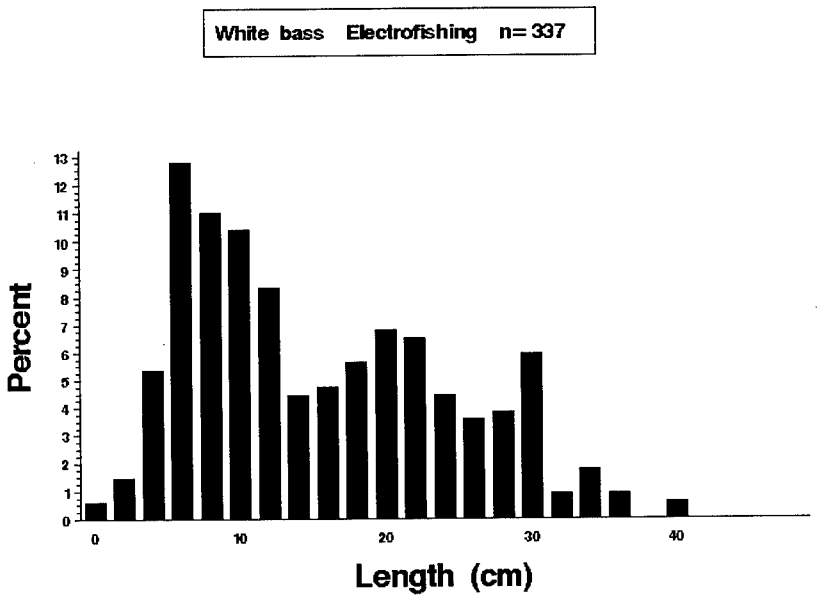

Figure 4.8. Length distributions (*length*) as a percentage of catch (*percent*) for white bass (*Morone chryops*) collected by electrofishing in Upper Mississippi River Pool 26 during 1992.

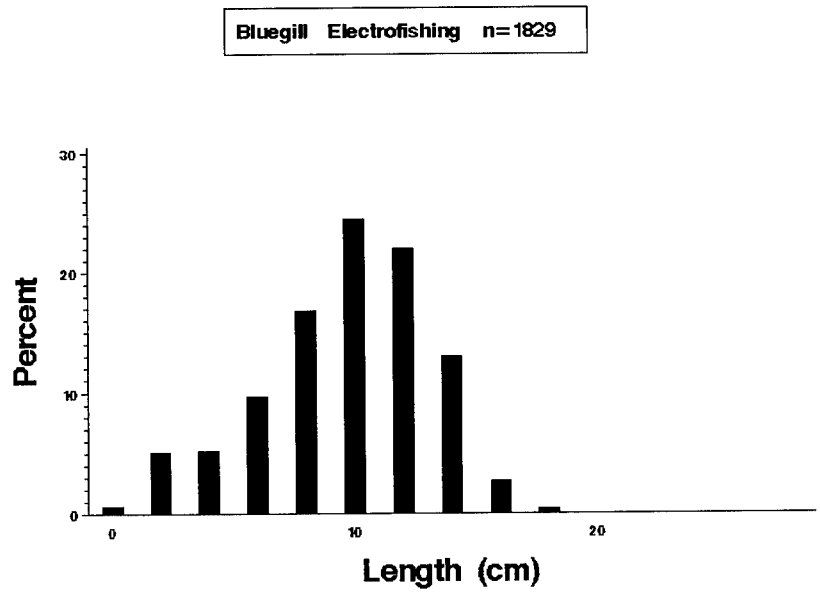

Figure 4.9. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by electrofishing in Upper Mississippi River Pool 26 during 1992.

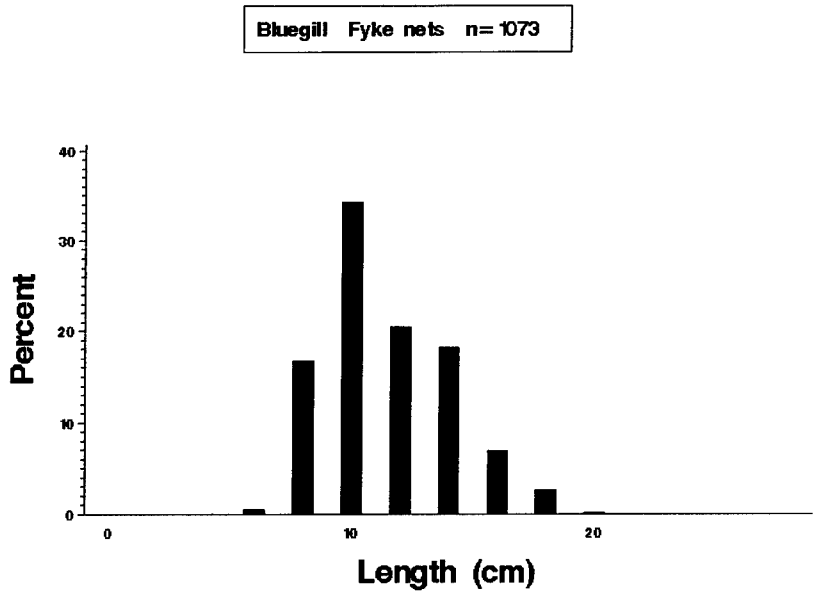

Figure 4.10. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by fyke netting in Upper Mississippi River Pool 26 during 1992.

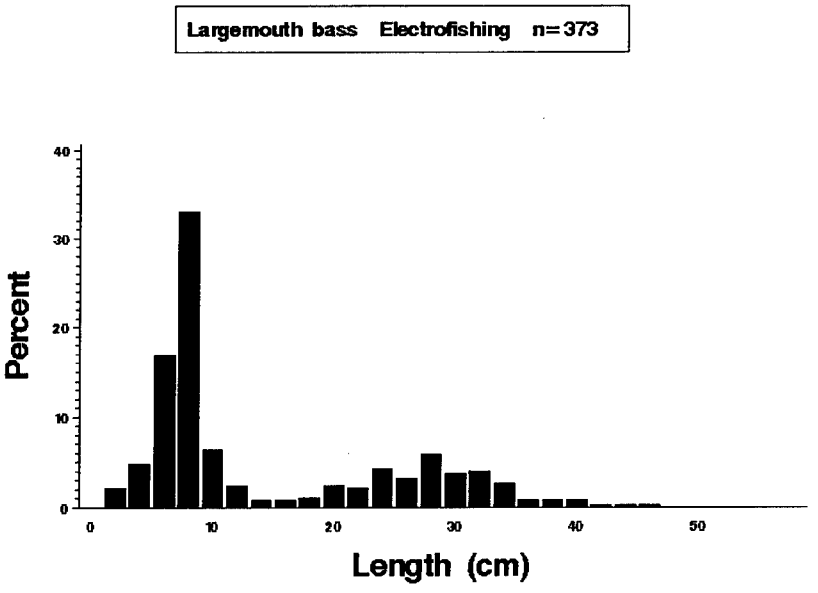

Figure 4.11. Length distributions (*length*) as a percentage of catch (*percent*) for largemouth bass (*Micropterus salmoides*) collected by electrofishing in Upper Mississippi River Pool 26 during 1992.

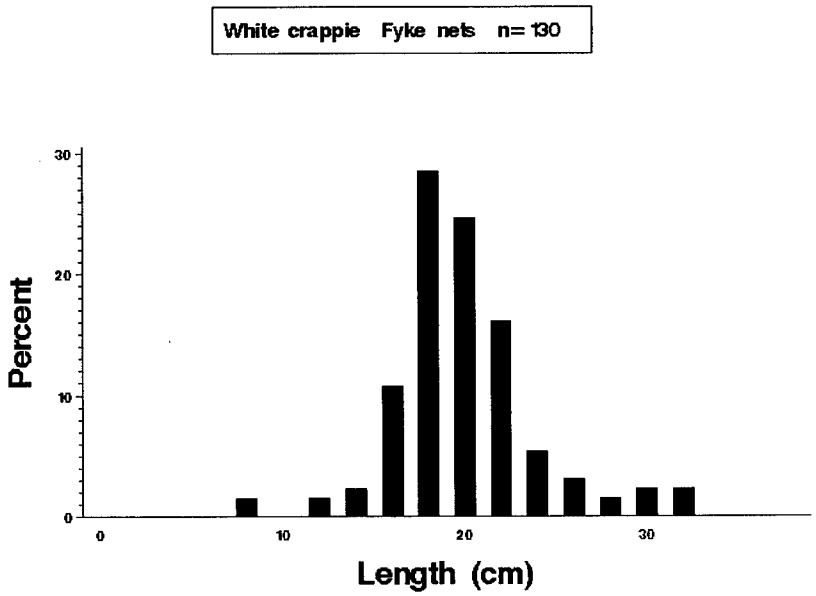

Figure 4.12. Length distributions (*length*) as a percentage of catch (*percent*) for white crappie (*Pomoxis annularus)* collected by fyke netting in Upper Mississippi River Pool 26 during 1992.

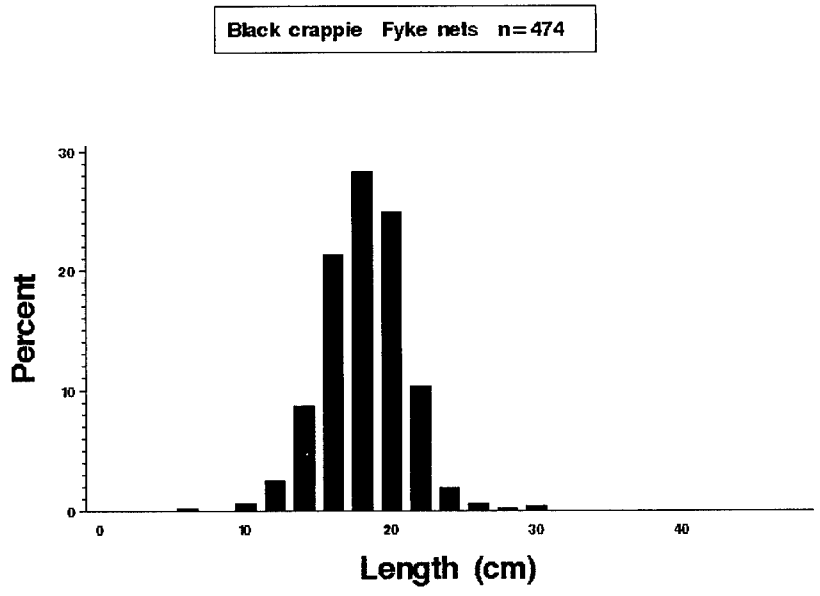

Figure 4.13. Length distributions (*length*) as a percentage of catch (*percent*) for black cra*ppie (Pomoxis nigromacula*tus) collected by electrofishing in Upper Mississippi River Pool 26 during 1992.

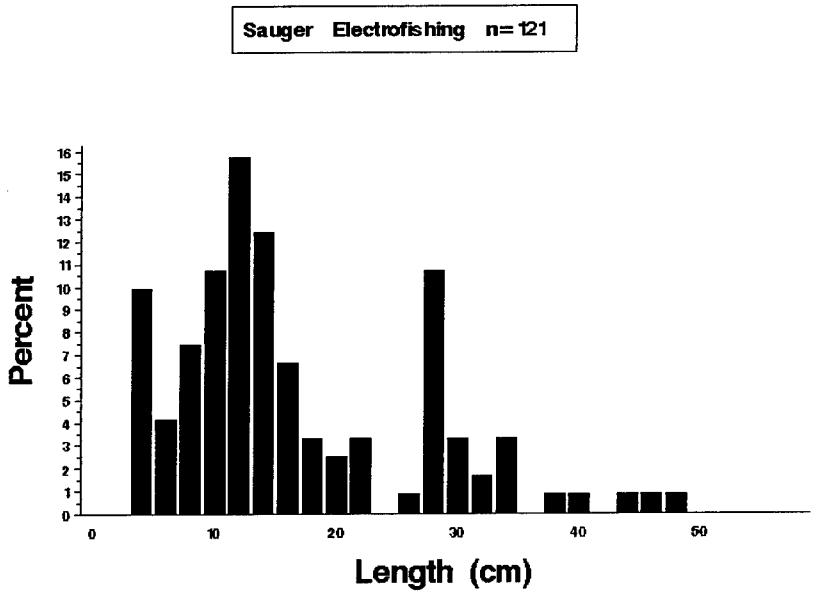

Figure 4.14. Length distributions (*length*) as a percentage of catch (*percent*) for sauger (*Stizostedion canade*nse) collected by electrofishing in Upper Mississippi River Pool 26 during 1992.

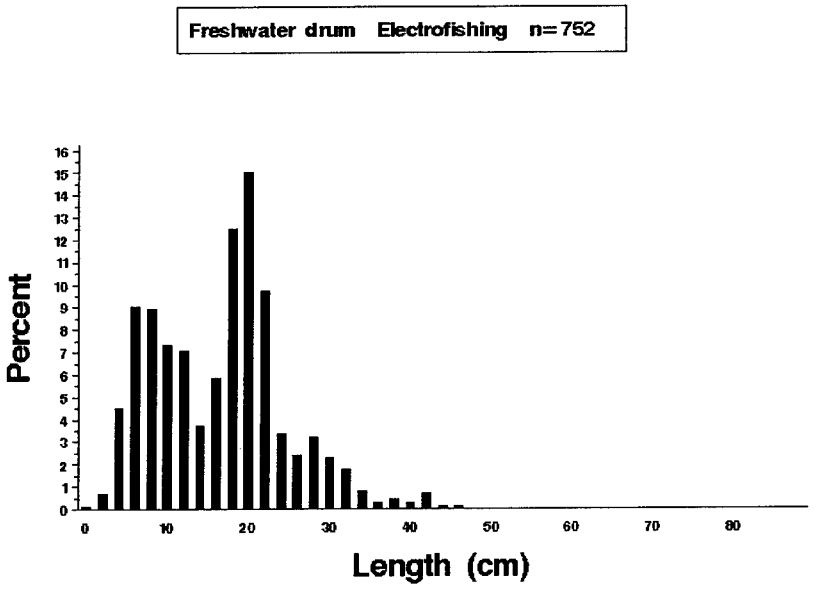

Figure 4.15. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by electrofishing in Upper Mississippi River Pool 26 during 1992.

Chapter 5. Mississippi River Open Reach

by

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Hydrograph

Open Mississippi River water stages are influenced by discharges from the Upper Mississippi, Missouri, Illinois, and to a lesser extent, Ohio Rivers. Water stage may fluctuate in the open river by 3–5 feet/week and more than 20 feet/year. At stages above 22.0 feet (Cape Girardeau Gage, 326 feet above mean sea level), successful gear sets are reduced by high water velocity and flooded riparian vegetation. At stages between 22.0 and 17.0 feet, wing dams become totally to partly submerged. Water velocity above submerged wing dams limits the use of most sampling gear. At stages below 17.0 feet, closing structures emerge making it difficult to access side channels. Gear must be carried in or private landowner permission must be granted to access isolated waters. The SCB is the most difficult stratum to sample, primarily because of access problems.

In 1992, water stages were higher than normal in midsummer and fall, and lower than normal in late spring and early summer. Fluctuations in water stage were typically 5–9 feet during 2-week periods. The lowest stage occurred on January 23 (9.8 feet), and the highest stage occurred on October 23 (34.0 feet). Water stages during Long Term Resource Monitoring Program (LTRMP) sampling in 1992 could be characterized as low and unstable (Figure 5.1).

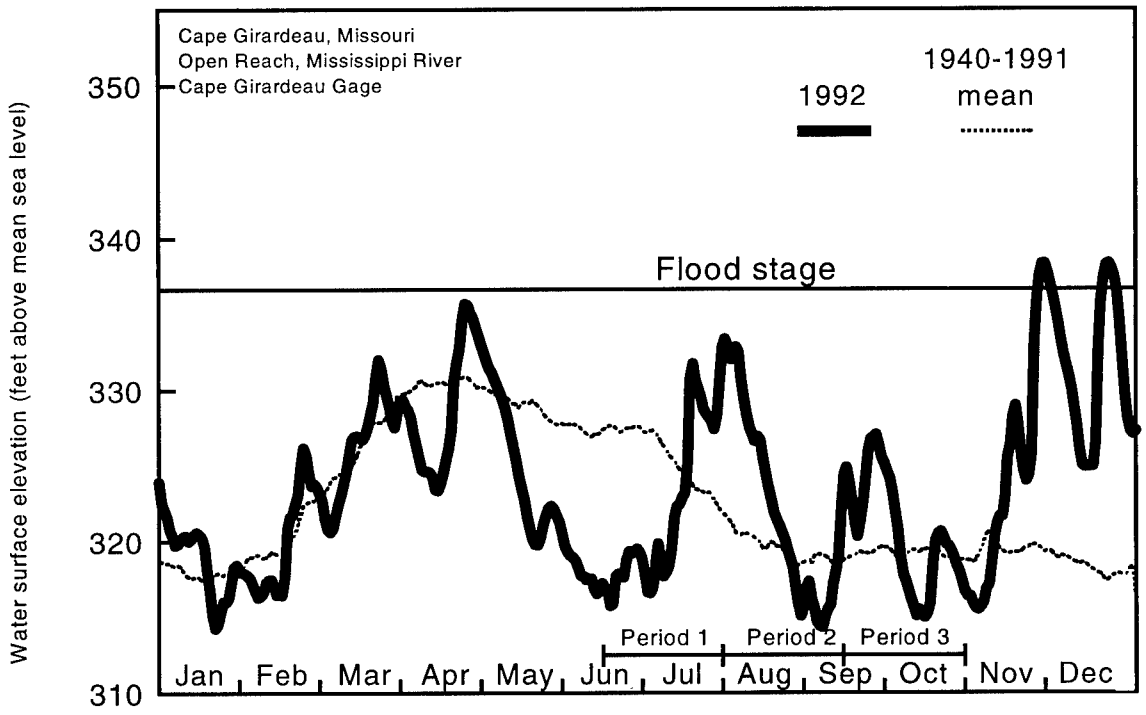

Figure 5.1. Daily water surface elevation from Cape Girardeau Gage for the Upper Mississippi River Open Reach, during 1992 and mean elevation since 1940. The U.S. Army Corps of Engineers discharge data were obtained from the Environmental Management Technical Center (Wlosinski et al. 1995).

Summary of Sampling Effort

In 1992, 22 fixed sites were subjectively chosen by Open River field station staff to best represent five habitat strata: SCB (10 sites), MCBU (3 sites), CTR (3 sites), MCBW (4 sites), and TRI (2 sites). Four hundred sixty-eight fixed-site samples were planned, consisting of 156 samples in each of three periods. We completed 396 samples (85% of what we planned to do) in 1992 consisting of 120, 141, and 135 samples in periods 1, 2, and 3, respectively (Table 5.1).

Total Catch by Gear

Historically, 129 fish species have been collected from the open river (Pitlo et al. 1995). In 1992, we collected 69 species and three hybrids representing 18,102 fish (Table 5.2). This total does not include 47 fish identified only to family or genus. The five most numerically abundant species were the gizzard shad (3,622), freshwater drum (2,735), emerald shiner (2,108), bluegill (1,937), and red shiner (1,411).

The following summarizes total fish catch and number of species by gear: day electrofishing, 3,212 fish and 55 species; night electrofishing, 2,618 fish and 46 species; fyke netting, 1,010 fish and 27 species; mini fyke netting, 4,852 fish and 46 species; seining, 3,871 fish and 32 species; tandem hoop netting, 732 fish and 32 species; gill netting, 1,412 fish and 27 species; and trawling, 395 fish and 18 species.

In 1992, exotic grass carp and bighead carp were collected by LTRMP biologists for the first time. Commercial fishers have reported catches of grass carp and bighead carp in the Mississippi River before 1992. Four Missouri-listed species were collected: paddlefish, mooneye, sicklefin chub, and blue sucker, which are candidates for Federal listing.

Fixed Sampling, Mean *C/f* by Gear and Stratum

Day Electrofishing

Gizzard shad (11.57 fish/15 min), freshwater drum (5.85), and common carp (2.03) had the highest day electrofishing *C/f* in the MCBU stratum (Table 5.3.1). Gizzard shad (9.19), freshwater drum (6.55), and channel catfish (2.82) had the highest *C/f* in the MCBW stratum. Gizzard shad (23.87), red shiner (10.18), and common carp (4.41) had the highest *C/f* in the SCB stratum. Gizzard shad (29.35), emerald shiner (28.63), and bluegill (23.13) had the highest *C/f* in the TRI stratum.

Night Electrofishing

Freshwater drum (8.77 fish/15 min), gizzard shad (4.08), and shortnose gar (3.75) had the highest night electrofishing *C/f* in the MCBU stratum (Table 5.3.2). Gizzard shad (9.97), freshwater drum (6.93), and shortnose gar (6.81) had the highest *C/f* in the MCBW stratum. Gizzard shad (12.62), red shiner (10.01), and freshwater drum (6.12) had the highest *C/f* in the SCB stratum. Bluegill (20.33), orangespotted sunfish (9.42), and gizzard shad (7.95) had the highest *C/f* in the TRI stratum. Gizzard shad and freshwater drum consistently had the highest *C/f*s across all habitat strata; bluegill had the highest *C/f* in the TRI.

Fyke Net

Freshwater drum (17.96 fish/net-day), shortnose gar (2.34), and river carpsucker (1.50) had the highest fyke netting *C/f* in the MCBU stratum (Table 5.3.3). Freshwater drum (9.99), shortnose gar (3.01), and river carpsucker (1.01) had the highest *C/f* in the MCBW stratum. Shortnose gar (6.72), freshwater drum (2.27), and white crappie (1.62) had the highest *C/f* in the SCB stratum. Bluegill (7.95), shortnose gar (6.73), and freshwater drum (6.01) had the highest *C/f* in the TRI stratum. Freshwater drum and shortnose gar consistently had the highest *C/f*s across all habitat strata.

Mini Fyke Net

Freshwater drum (150.08 fish/net-day), emerald shiner (59.47), and gizzard shad (10.81) had the highest mini fyke netting *C/f* in the MCBU stratum (Table 5.3.4). Emerald shiner (51.37), freshwater drum (14.73), and red shiner (4.79) had the highest *C/f* in the MCBW stratum. Freshwater drum (7.89), red shiner (7.87), and bluegill (5.14) had the highest *C/f* in the SCB stratum. Bluegill (198.86), bullhead minnow (8.51), and channel shiner (5.71) had the highest *C/f* in the TRI stratum.

Tandem Hoop Nets

Channel catfish (5.67 fish/net-day), smallmouth buffalo (1.31), and freshwater drum (0.96) had the highest tandem hoop netting *C/f* in the MCBU stratum (Table 5.3.5). Freshwater drum (1.10), channel catfish (0.46), and flathead catfish (0.21) had the highest *C/f* in the MCBW stratum. Channel catfish (3.92), river carpsucker (1.95), and common carp (1.69) had the highest *C/f* in the SCB stratum. River carpsucker (4.60), channel catfish (3.22), and smallmouth buffalo (2.88) had the highest *C/f* in the TRI stratum. Channel catfish consistently had some of the higher *C/fs* across all habitat strata.

Seine

River shiner (1.33 fish/haul), emerald shiner (1.22), and freshwater drum (0.78) had the highest seining *C/f* in the MCBU stratum (Table 5.3.6). Gizzard shad (22.00), emerald shiner (11.95), and red shiner (9.86) had the highest *C/f* in the SCB stratum. Most of the fish collected by seining were young of the year, except cyprinids.

Gill Net

Freshwater drum (5.32 fish/net-day), gizzard shad (4.41), and blue catfish (3.67) had the highest gill netting *C/f* in the MCBW stratum (Table 5.3.7). Gizzard shad (20.99), shortnose gar (5.56), and goldeye (2.92) had the highest *C/f* in the SCB stratum. Gizzard shad (48.22), freshwater drum (35.03), and shortnose gar (14.21) had the highest *C/f* in the TRI stratum. Gizzard shad consistently had the higher *C/f*s across all strata.

Trawl

Channel catfish (8.00 fish/haul), freshwater drum (2.68), and blue catfish (2.58) had the highest *C/f* in the MCBU stratum (Table 5.3.8). Channel catfish (2.68), speckled chub (0.64), and blue catfish (0.45) had the

highest *C/f* in the SCB stratum. Channel catfish (0.08, note standard error) had the highest trawling *C/f* in the CTR stratum. Channel catfish consistently had the highest catch rates across all strata. Most fish collected by trawling were young of the year.

Length Distributions of Selected Species

Length–frequency histograms are presented for selected species in Figures 5.2 to 5.14. Meaningful biological interpretation of the histograms is limited because of small sample size or size selectivity of the gear (Anderson and Neumann 1996). Despite these biases, some river managers may find the histograms useful, therefore we have included them in this report. No age–growth data are available at this time for the open Mississippi River study reach.

Gizzard Shad

We collected 1,554 gizzard shad by day and night electrofishing and measured 1,368 subsampled gizzard shad for length–frequency (Figure 5.2). The bimodal length–frequency distribution was composed largely of 12–26-cm-long fish. The 186 unmeasured gizzard shad were not applied to the length–frequency distribution. Most of the unmeasured gizzard shad were between 3 and 4 cm long.

Common Carp

Three hundred forty-nine common carp were collected by day and night electrofishing (Figure 5.3). Modal length was 46 cm, with most common carp between 42 and 56 cm long.

Smallmouth Buffalo

Forty-six smallmouth buffalo were collected by day and night electrofishing (Figure 5.4). The length–frequency distribution comprised 1–64-cm-long fish, with a mode of 32 cm.

Eighty-seven smallmouth buffalo were collected by tandem hoop nets (Figure 5.5). The length–frequency distribution comprised 16–64-cm-long fish. Most smallmouth buffalo were between 26 and 32 cm long.

Channel Catfish

One hundred thirty-nine channel catfish were collected by day and night electrofishing (Figure 5.6). The bimodal length–frequency distribution comprised 2–63-cm-long fish, with modes at 10 and 38 cm.

Two hundred seventy-five channel catfish were collected by tandem hoop nets (Figure 5.7). The bimodal length–frequency distribution comprised 6–56-cm-long fish, with modes at 16 and 38 cm.

White Bass

Sixty-five white bass were collected by day and night electrofishing (Figure 5.8). The length–frequency distribution comprised 2–36-cm-long fish, with modes at 4, 18, and 28 cm.

Bluegill

Four hundred seventy-four bluegill were collected by day and night electrofishing (Figure 5.9). The length–frequency distribution comprised 1–18-cm-long fish, with a mode of 2 cm.

Eighty-seven bluegill were collected by fyke netting (Figure 5.10). The length–frequency distribution comprised 8–18-cm-long fish. Most bluegill were between 10 and 14 cm long.

Largemouth Bass

Thirty-three largemouth bass were collected by day and night electrofishing (Figure 5.11). The length–frequency distribution comprised 6–46-cm-long fish. Most largemouth bass were between 24 and 32 cm long.

White Crappie

Sixty-six white crappie were collected by fyke netting (Figure 5.12). The length–frequency distribution comprised 6–30-cm-long fish, with modes at 8 and 18 cm.

Black Crappie

Twenty-eight black crappie were collected by fyke netting (Figure 5.13). The length–frequency distribution comprised 8 to 26-cm-long fish.

Sauger

Fifty-five sauger were collected by day and night electrofishing (Figure 5.14). The length–frequency distribution comprised 4–44-cm-long fish. Most sauger were between 4 and 6 cm.

Freshwater Drum

Five hundred seventy-eight freshwater drum were collected by day and night electrofishing (Figure 5.15). The length–frequency distribution comprised 2–38-cm-long fish, with modes at 8, 18, and 28 cm. Most freshwater drum were between 14 and 22 cm.

Three hundred three freshwater drum were collected by fyke nets (Figure 5.16). The length–frequency distribution comprised 6–40-cm-long fish. Most freshwater drum were between 14 and 22 cm.

Table 5.1. Allocation of fish sampling effort among strata by the Long Term Resource Monitoring Program in the open Mississippi River during 1992. Table entries are numbers of successfully completed standardized monitoring collections.

Sampling period = 1: June 15 - July 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	CTR	TWZ	TOTAL
Day electrofishing			10	3	4					19
Fyke net			9	2	2					15
Gill net			7							9
Tandem hoop net			7	3	4					16
Mini fyke net			8	2	5					17
Night electrofishing			8	3	3					16
Seine			12	2						14
Trawling			3	7				4		14
SUBTOTAL	0	0	64	22	18	0	0	4	0	120

Sampling period = 2: August 1 - September 14

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	CTR	TWZ	TOTAL
Day electrofishing			9	3	4					18
Fyke net			9	2	4					17
Gill net			7		4					13
Tandem hoop net			5	3	4					14
Mini fyke net			9	2	4					17
Night electrofishing			10	3	1					16
Seine			24	8						32
Trawling			4	6				4		14
SUBTOTAL	0	0	77	27	21	0	0	4	0	141

Sampling period = 3: September 15 - October 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	CTR	TWZ	TOTAL
Day electrofishing			7	3	4					16
Fyke net			10	2	4					18
Gill net			7		4					12
Tandem hoop net			5	3	4					14
Mini fyke net			10	2	3					17
Night electrofishing			8	3	3					16
Seine			20	8						28
Trawling			4	6				4		14
SUBTOTAL	0	0	71	27	22	0	0	4	0	135
	0	0	212	76	61	0	0	12	0	396

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
CTR - Main channel trough.
TWZ - Tailwater.

Table 5.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1992 in the open Mississippi River. See Table 5.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	H	T	TOTAL
41	Bigmouth buffalo	Ictiobus cyprinellus	59	14	1	-	-	-	-	2	-	102
42	Black buffalo	Ictiobus niger	-	-	-	-	-	-	-	-	-	1
43	Unidentified buffalo	Ictiobus sp.	3	1	-	-	-	-	36	-	-	40
44	River redhorse	Moxostoma carinatum	1	-	-	-	-	-	-	-	-	1
45	Shorthead redhorse	Moxostoma macrolepidotum	-	-	2	-	-	-	-	-	-	6
46	Unidentified redhorse	Moxostoma sp.	-	-	-	-	-	-	1	-	-	1
47	Unidentified sucker	Catostomidae sp.	-	-	-	-	-	-	1	-	-	1
48	Black bullhead	Ameiurus melas	-	-	-	-	1	-	-	-	-	1
49	Blue catfish	Ictalurus furcatus	15	-	1	-	3	-	-	4	54	112
50	Channel catfish	Ictalurus punctatus	102	37	37	-	57	-	39	275	182	771
51	Freckled madtom	Noturus nocturnus	7	3	-	-	1	-	-	-	1	12
52	Flathead catfish	Pylodictis olivaris	40	23	27	-	6	-	1	19	1	120
53	Blackstripe topminnow	Fundulus notatus	21	19	-	-	2	-	-	-	-	42
54	Western mosquitofish	Gambusia affinis	14	21	-	-	6	-	11	-	-	52
55	Brook silverside	Labidesthes sicculus	-	8	-	-	-	-	-	-	-	8
56	White bass	Morone chrysops	31	34	37	-	24	-	6	7	2	150
57	Yellow bass	Morone mississippiensis	-	1	9	-	-	-	-	-	-	17
58	Striped bass	Morone saxatilis	2	-	-	-	-	-	-	-	-	3
59	Green sunfish	Lepomis cyanellus	3	10	1	-	1	-	-	-	-	15
60	Warmouth	Lepomis gulosus	4	3	1	-	4	-	-	-	-	12
61	Orangespotted sunfish	Lepomis humilis	72	138	-	-	69	-	32	-	-	311
62	Bluegill	Lepomis macrochirus	255	219	87	-	1322	-	28	26	-	1937
63	Longear sunfish	Lepomis megalotis	53	17	-	-	2	-	3	-	-	76
64	Green sunfish x bluegill	L. cyanellus x L. macrochirus	1	-	-	-	1	-	-	-	-	2
65	Green sunfish hybrid	L. cyanellus x lepomis sp.	-	1	-	-	-	-	-	-	-	1
66	Orangespotted x longear sunfish	L. humilis x L. megalotis	3	-	1	-	-	-	-	-	-	4
67	Spotted bass	Micropterus punctulatus	14	2	1	-	-	-	-	-	-	18
68	Largemouth bass	Micropterus salmoides	21	12	-	-	1	-	-	1	-	36
69	White crappie	Pomoxis annularis	42	19	66	-	22	-	-	16	-	166
70	Black crappie	Pomoxis nigromaculatus	17	1	28	-	7	-	-	1	-	54
71	Unidentified sunfish	Centrarchidae sp.	-	1	-	-	-	-	-	-	-	1
72	Mud darter	Etheostoma asprigene	1	-	-	-	6	-	-	-	-	7
73	Bluntnose darter	Etheostoma chlorosomum	1	-	-	-	4	-	-	-	-	5
74	Slough darter	Etheostoma gracile	-	-	-	-	1	-	-	-	-	1
75	Johnny darter	Etheostoma nigrum	-	1	-	-	-	-	-	-	-	1
76	River darter	Percina shumardi	-	-	-	-	6	-	-	-	-	6
77	Sauger	Stizostedion canadense	19	36	7	-	7	-	2	-	6	91
78	Freshwater drum	Aplodinotus grunniens	214	364	303	-	1272	-	252	66	54	2735
			3215	2620	1010	0	4854	0	3909	733	396	18149

Gears: D - Day electrofishing
N - Night electrofishing
F - Fyke netting
M - Mini fyke netting
T - Trawling (4.8-m bottom trawl)
S - Seining
H - Tandem hoop netting
X - Tandem fyke netting
Y - Tandem min fyke netting

Table 5.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1992 in the open Mississippi River. See Table 5.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	H	T	TOTAL
1	Chestnut lamprey	Ichthyomyzon castaneus	6	5	-	-	-	-	-	-	-	11
2	Shovelnose sturgeon	Scaphirhynchus platorynchus	-	-	-	-	-	-	-	-	17	45
3	Paddlefish	Polyodon spathula	2	-	-	-	-	-	-	-	-	4
4	Spotted gar	Lepisosteus oculatus	3	2	-	-	-	-	-	-	-	5
5	Longnose gar	Lepisosteus osseus	4	5	1	-	1	-	-	-	-	14
6	Shortnose gar	Lepisosteus platostomus	113	183	268	-	15	-	22	10	-	787
7	Bowfin	Amia calva	4	1	2	-	-	-	-	1	-	11
8	Goldeye	Hiodon alosoides	23	10	2	-	2	-	-	-	3	148
9	Mooneye	Hiodon tergisus	1	-	-	-	-	-	-	-	18	19
10	American eel	Anguilla rostrata	4	2	7	-	-	-	-	2	-	15
11	Skipjack herring	Alosa chrysochloris	6	8	1	-	8	-	1	-	1	45
12	Gizzard shad	Dorosoma cepedianum	1027	527	42	-	107	-	1236	16	4	3622
13	Threadfin shad	Dorosoma petenense	9	2	2	-	1	-	8	-	-	22
14	Grass carp	Ctenopharyngodon idella	-	-	-	-	1	-	3	-	-	4
15	Red shiner	Cyprinella lutrensis	266	313	-	-	280	-	552	-	-	1411
16	Spotfin shiner	Cyprinella spiloptera	-	4	-	-	3	-	1	-	-	8
17	Blacktail shiner	Cyprinella venusta	6	7	-	-	-	-	4	-	-	17
18	Common carp	Cyprinus carpio	197	152	24	-	12	-	1	78	-	479
19	Western silvery minnow	Hybognathus argyritis	-	-	-	-	1	-	-	-	-	1
20	Plains minnow	Hybognathus placitus	3	-	-	-	-	-	16	-	-	19
21	Bighead carp	Hypopthalmichthys nobilis	8	-	-	-	2	-	2	-	-	12
22	Speckled chub	Macrhybopsis aestivalis	2	1	-	-	58	-	37	-	22	120
23	Sicklefin chub	Macrhybopsis meeki	1	-	-	-	13	-	7	-	16	37
24	Silver chub	Macrhybopsis storeriana	7	-	-	-	23	-	17	-	6	53
25	Emerald shiner	Notropis atherinoides	289	104	-	-	1024	-	691	-	-	2108
26	River shiner	Notropis blennius	17	7	-	-	92	-	181	-	-	297
27	Ghost shiner	Notropis buchanani	-	-	-	-	-	-	2	-	-	2
28	Silverband shiner	Notropis shumardi	18	17	-	-	79	-	7	-	-	121
29	Channel shiner	Notropis wickliffi	23	11	-	-	98	-	37	-	4	173
30	Pugnose minnow	Opsopoeodus emiliae	-	1	-	-	4	-	-	-	-	5
31	Bluntnose minnow	Pimephales notatus	1	-	-	-	3	-	-	-	-	4
32	Fathead minnow	Pimephales promelas	1	-	-	-	-	-	-	-	-	1
33	Bullhead minnow	Pimephales vigilax	52	199	-	-	174	-	210	-	-	635
34	Unidentified minnow	Cyprinidae sp.	-	-	-	-	2	-	-	-	1	3
35	River carpsucker	Carpiodes carpio	72	61	48	-	21	-	454	120	3	806
36	Quillback	Carpiodes cyprinus	-	1	-	-	-	-	5	1	-	8
37	Unidentified carpsucker	Carpiodes sp.	-	-	-	-	-	-	-	1	-	1
38	Blue sucker	Cycleptus elongatus	-	-	-	-	-	-	-	-	1	1
39	Creek chubsucker	Erimyzon oblongus	1	-	-	-	-	-	-	-	-	1
40	Smallmouth buffalo	Ictiobus bubalus	34	12	4	-	5	-	3	87	-	155

Gears: D - Day electrofishing
N - Night electrofishing
F - Fyke netting
M - Mini fyke netting
T - Trawling (4.8-m bottom trawl)
S - Seining
H - Tandem hoop netting
X - Tandem fyke netting
Y - Tandem min fyke netting

Table 5.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by day electrofishing in the open Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Chestnut lamprey					0.35 (0.24)		0.08 (0.05)		0.17 (0.17)	
Paddlefish						0.08 (0.08)	0.03 (0.03)			
Spotted gar							0.04 (0.04)		0.33 (0.33)	
Longnose gar						0.08 (0.08)	0.12 (0.06)			
Shortnose gar					1.08 (0.63)	1.35 (0.48)	3.14 (0.94)		2.50 (1.18)	
Bowfin									0.67 (0.49)	
Goldeye					1.43 (0.76)	0.29 (0.15)	0.31 (0.11)			
Mooneye					0.11 (0.11)					
American eel						0.36 (0.20)				
Skipjack herring						0.17 (0.11)	0.15 (0.12)			
Gizzard shad					11.57 (8.01)	9.19 (3.99)	23.87 (13.24)		29.35 (10.57)	
Threadfin shad							0.15 (0.10)		0.79 (0.62)	
Red shiner					0.11 (0.11)	1.01 (0.40)	10.18 (2.83)		1.63 (1.29)	
Blacktail shiner									0.79 (0.62)	
Common carp					2.03 (0.88)	1.83 (0.51)	4.41 (1.61)		6.38 (1.25)	
Plains minnow									0.50 (0.34)	
Bighead carp									1.33 (1.15)	
Speckled chub							0.08 (0.08)			
Sicklefin chub					0.11 (0.11)					
Silver chub					0.51 (0.51)		0.08 (0.08)		0.17 (0.17)	
Emerald shiner					1.12 (0.63)	1.68 (0.90)	3.37 (1.18)		28.63 (23.91)	
River shiner					0.33 (0.33)	0.25 (0.13)	0.31 (0.17)		0.50 (0.50)	
Silverband shiner					0.11 (0.11)	0.08 (0.08)	0.59 (0.41)		0.67 (0.42)	
Channel shiner					0.24 (0.16)	0.48 (0.33)	0.12 (0.08)		1.71 (1.35)	
Bluntnose minnow							0.05 (0.05)			
Fathead minnow							0.04 (0.04)			
Bullhead minnow							0.83 (0.24)		4.09 (2.55)	
River carpsucker					1.13 (0.35)	0.43 (0.26)	1.73 (0.37)		1.67 (0.56)	
Creek chubsucker									0.17 (0.17)	
Smallmouth buffalo					0.11 (0.11)	0.25 (0.13)	0.63 (0.30)		1.88 (0.41)	

Strata: BWCS - Backwater, contiguous, shoreline
BWCO - Backwater, contiguous, offshore
IMPS - Impounded, shoreline
IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 5.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by day electrofishing in the open Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Bigmouth buffalo						0.17	1.28		3.33	
						(0.11)	(0.56)		(2.19)	
River redhorse									0.17	
									(0.17)	
Blue catfish						0.83	0.16		0.13	
						(0.39)	(0.09)		(0.13)	
Channel catfish					1.23	2.82	2.09		0.50	
					(0.56)	(0.74)	(0.42)		(0.22)	
Freckled madtom						0.53	0.04			
						(0.24)	(0.04)			
Flathead catfish					0.52	1.50	0.53		0.79	
					(0.28)	(0.38)	(0.13)		(0.31)	
Blackstripe topminnow							0.23		2.38	
							(0.17)		(0.42)	
Western mosquitofish							0.50		0.17	
							(0.26)		(0.17)	
White bass					0.37	1.08	0.48		0.50	
					(0.18)	(0.43)	(0.22)		(0.34)	
Striped bass							0.04		0.13	
							(0.04)		(0.13)	
Green sunfish							0.12			
							(0.08)			
Warmouth							0.04		0.50	
							(0.04)		(0.34)	
Orangespotted sunfish						0.17	2.23		2.04	
						(0.11)	(1.03)		(0.81)	
Bluegill					0.11	1.01	3.72		23.13	
					(0.11)	(0.44)	(1.20)		(10.68)	
Longear sunfish						0.10	1.92		0.50	
						(0.10)	(0.90)		(0.34)	
Green sunfish x bluegill							0.04			
							(0.04)			
Orangespotted x longear sunfish									0.50	
									(0.50)	
Spotted bass						0.08	0.08		1.67	
						(0.08)	(0.08)		(0.50)	
Largemouth bass						0.25	0.24		1.75	
						(0.25)	(0.11)		(0.60)	
White crappie						0.08	1.22		0.63	
						(0.08)	(0.68)		(0.33)	
Black crappie						0.25	0.13		1.54	
						(0.13)	(0.07)		(0.81)	
Mud darter						0.08				
						(0.08)				
Bluntnose darter									0.13	
									(0.13)	
Sauger					0.35		0.57		0.33	
					(0.18)		(0.19)		(0.33)	
Freshwater drum					5.85	6.55	3.65		0.63	
					(1.77)	(1.43)	(0.95)		(0.33)	

Strata: BWCS - Backwater, contiguous, shoreline
BWCO - Backwater, contiguous, offshore
IMPS - Impounded, shoreline
IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 5.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by night electrofishing in the open Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Chestnut lamprey							0.16			
							(0.11)			
Spotted gar									0.29	
									(0.19)	
Longnose gar					0.11		0.15			
					(0.11)		(0.07)			
Shortnose gar					3.75	6.81	3.28		1.67	
					(2.39)	(4.92)	(0.95)		(0.59)	
Bowfin									0.17	
									(0.17)	
Goldeye					0.22	0.36	0.19		0.16	
					(0.15)	(0.23)	(0.12)		(0.16)	
American eel						0.31				
						(0.20)				
Skipjack herring							0.19		0.47	
							(0.12)		(0.47)	
Gizzard shad					4.08	9.97	12.62		7.95	
					(1.51)	(5.72)	(3.47)		(3.96)	
Threadfin shad									0.28	
									(0.28)	
Red shiner					0.35	2.69	10.01		0.75	
					(0.25)	(1.20)	(2.10)		(0.36)	
Spotfin shiner							0.15			
							(0.11)			
Blacktail shiner									0.88	
									(0.88)	
Common carp					1.73	1.71	3.80		2.70	
					(1.22)	(0.52)	(2.01)		(1.20)	
Speckled chub					0.11					
					(0.11)					
Emerald shiner					2.58	3.28	1.59		1.67	
					(1.40)	(1.76)	(0.42)		(1.06)	
River shiner					0.27		0.12		0.13	
					(0.18)		(0.12)		(0.13)	
Silverband shiner							0.58		0.31	
							(0.38)		(0.19)	
Channel shiner						0.29	0.07		1.07	
						(0.29)	(0.05)		(0.64)	
Pugnose minnow									0.13	
									(0.13)	
Bullhead minnow					1.11	0.26	5.32		3.45	
					(1.11)	(0.17)	(2.41)		(2.93)	
River carpsucker					2.02	0.31	1.36		0.26	
					(1.76)	(0.20)	(0.53)		(0.17)	
Quillback							0.03			
							(0.03)			
Smallmouth buffalo					0.11	0.71	0.15		0.31	
					(0.11)	(0.57)	(0.09)		(0.19)	
Bigmouth buffalo							0.30		0.70	
							(0.14)		(0.32)	
Channel catfish					0.71	0.78	0.87		0.26	
					(0.45)	(0.32)	(0.35)		(0.17)	
Freckled madtom					0.11	0.14	0.04			
					(0.11)	(0.14)	(0.04)			
Flathead catfish					0.54	1.16	0.32		0.13	
					(0.36)	(0.35)	(0.10)		(0.13)	
Blackstripe topminnow							0.42		1.09	
							(0.24)		(0.41)	
Western mosquitofish							0.55		0.81	
							(0.26)		(0.53)	

Strata: BWCS - Backwater, contiguous, shoreline
BWCO - Backwater, contiguous, offshore
IMPS - Impounded, shoreline
IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 5.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by night electrofishing in the open Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Brook silverside					0.08		0.12		0.54	
					(0.08)		(0.08)		(0.38)	
White bass					0.22	0.74	0.76		1.06	
					(0.15)	(0.57)	(0.32)		(0.67)	
Yellow bass									0.14	
									(0.14)	
Green sunfish						1.15	0.12			
						(1.15)	(0.08)			
Warmouth									0.38	
									(0.38)	
Orangespotted sunfish							2.40		9.42	
							(0.80)		(5.52)	
Bluegill						0.88	2.23		20.33	
						(0.46)	(0.69)		(11.09)	
Longear sunfish						0.49	0.54			
						(0.49)	(0.33)			
Green sunfish hybrid							0.04			
							(0.04)			
Spotted bass							0.04		0.17	
							(0.04)		(0.17)	
Largemouth bass						0.14	0.25		0.60	
						(0.14)	(0.10)		(0.19)	
White crappie							0.35		1.32	
							(0.17)		(0.67)	
Black crappie									0.13	
									(0.13)	
Johnny darter							0.04			
							(0.04)			
Sauger					0.33	0.31	1.03		0.61	
					(0.24)	(0.20)	(0.54)		(0.46)	
Freshwater drum					8.77	6.93	6.12		6.21	
					(5.47)	(2.35)	(1.46)		(2.49)	

Strata: BWCS - Backwater, contiguous, shoreline
BWCO - Backwater, contiguous, offshore
IMPS - Impounded, shoreline
IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 5.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by fyke netting in the open Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Longnose gar					0.16					
					(0.16)					
Shortnose gar					2.34	3.01	6.72		6.73	
					(1.55)	(1.21)	(2.78)		(3.23)	
Bowfin									0.31	
									(0.20)	
Goldeye					0.17		0.04			
					(0.17)		(0.04)			
American eel						0.41	0.04		0.32	
						(0.22)	(0.04)		(0.20)	
Skipjack herring							0.03			
							(0.03)			
Gizzard shad					0.86	0.49	1.17			
					(0.47)	(0.22)	(0.37)			
Threadfin shad							0.07			
							(0.05)			
Common carp					0.34	0.31	0.40		1.43	
					(0.22)	(0.16)	(0.13)		(1.06)	
River carpsucker					1.50	1.01	0.80		1.03	
					(0.94)	(0.40)	(0.28)		(0.68)	
Smallmouth buffalo						0.09	0.11			
						(0.09)	(0.06)			
Bigmouth buffalo							0.04			
							(0.04)			
Shorthead redhorse							0.03		0.19	
							(0.03)		(0.19)	
Blue catfish						0.10				
						(0.10)				
Channel catfish						0.47	1.00		0.65	
						(0.28)	(0.28)		(0.49)	
Flathead catfish						0.90	0.63			
						(0.38)	(0.32)			
White bass					0.65	0.60	0.82		0.69	
					(0.65)	(0.35)	(0.30)		(0.49)	
Yellow bass					0.33	0.09	0.18		0.19	
					(0.33)	(0.09)	(0.09)		(0.19)	
Green sunfish							0.04			
							(0.04)			
Warmouth									0.15	
									(0.15)	
Bluegill					0.69	0.20	1.11		7.95	
					(0.44)	(0.13)	(0.28)		(3.73)	
Orangespotted x longear sunfish									0.16	
									(0.16)	
Spotted bass									0.15	
									(0.15)	
White crappie					0.49		1.62		3.08	
					(0.49)		(0.52)		(1.18)	
Black crappie					0.16		0.40		2.41	
					(0.16)		(0.23)		(1.29)	
Sauger					0.17	0.48	0.04			
					(0.17)	(0.28)	(0.04)			
Freshwater drum					17.96	9.99	2.27		6.01	
					(7.85)	(4.43)	(0.80)		(3.89)	

Strata: BWCS - Backwater, contiguous, shoreline
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SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 5.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by mini fyke netting in the open Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Longnose gar						0.08 (0.08)				
Shortnose gar					0.50 (0.22)	0.34 (0.19)	0.29 (0.17)			
Goldeye					0.35 (0.35)					
Skipjack herring					0.18 (0.18)	0.17 (0.17)	0.04 (0.04)		0.71 (0.71)	
Gizzard shad					10.81 (4.70)	2.52 (1.48)	0.34 (0.16)		1.06 (1.06)	
Threadfin shad					0.17 (0.17)					
Grass carp							0.03 (0.03)			
Red shiner					4.74 (2.61)	4.79 (2.24)	7.87 (4.06)			
Spotfin shiner					0.50 (0.50)					
Common carp					1.05 (0.72)	0.09 (0.09)	0.16 (0.16)		0.18 (0.18)	
Western silvery minnow						0.09 (0.09)				
Bighead carp						0.09 (0.09)			0.18 (0.18)	
Speckled chub					0.85 (0.66)	0.16 (0.11)	1.98 (1.74)			
Sicklefin chub					1.53 (1.16)		0.16 (0.10)			
Silver chub					0.52 (0.36)	0.69 (0.32)	0.40 (0.26)		0.18 (0.18)	
Emerald shiner					59.47 (26.65)	51.37 (41.50)	2.36 (0.87)		0.71 (0.71)	
River shiner					9.62 (3.13)	2.29 (1.08)	0.31 (0.20)			
Silverband shiner					0.86 (0.42)	1.61 (1.00)	1.12 (0.58)		4.60 (4.20)	
Channel shiner					3.24 (0.90)	1.16 (0.56)	1.29 (0.50)		5.71 (5.31)	
Pugnose minnow									0.54 (0.37)	
Bluntnose minnow					0.50 (0.50)					
Bullhead minnow					3.42 (1.05)	0.89 (0.54)	3.63 (1.38)		8.51 (7.25)	
River carpsucker					1.01 (1.01)	0.76 (0.52)	0.22 (0.13)			
Smallmouth buffalo					0.83 (0.83)					
Black bullhead						0.08 (0.08)				
Blue catfish							0.12 (0.12)			
Channel catfish					0.17 (0.17)	2.03 (0.56)	1.26 (0.49)			
Freckled madtom						0.09 (0.09)				
Flathead catfish							0.19 (0.12)		0.08 (0.08)	
Blackstripe topminnow							0.04 (0.04)		0.19 (0.19)	

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SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 5.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by mini fyke netting in the open Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Western mosquitofish					0.50	0.26				
					(0.34)	(0.26)				
White bass					2.67	0.25	0.18			
					(2.29)	(0.18)	(0.09)			
Green sunfish							0.04			
							(0.04)			
Warmouth						0.09	0.03		0.35	
						(0.09)	(0.03)		(0.35)	
Orangespotted sunfish						0.43	1.45		4.05	
						(0.20)	(0.85)		(2.64)	
Bluegill					3.55	2.90	5.14		198.86	
					(3.34)	(2.45)	(1.80)		(191.75)	
Longear sunfish						0.08	0.04			
						(0.08)	(0.04)			
Green sunfish x bluegill							0.03			
							(0.03)			
Largemouth bass							0.04			
							(0.04)			
White crappie					0.17	0.26	0.51		0.34	
					(0.17)	(0.14)	(0.17)		(0.34)	
Black crappie					0.34	0.17	0.03		0.37	
					(0.21)	(0.11)	(0.03)		(0.37)	
Mud darter					0.17		0.04		0.71	
					(0.17)		(0.04)		(0.71)	
Bluntnose darter							0.03		0.56	
							(0.03)		(0.56)	
Slough darter									0.19	
									(0.19)	
River darter							0.21			
							(0.21)			
Sauger						0.08	0.21			
						(0.08)	(0.16)			
Freshwater drum					150.08	14.73	7.89		0.54	
					(140.71)	(4.03)	(5.72)		(0.37)	

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MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 5.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by tandem hoop netting in the open Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Shortnose gar					0.06		0.21		0.16	
					(0.06)		(0.09)		(0.10)	
Bowfin									0.08	
									(0.08)	
American eel						0.04			0.08	
						(0.04)			(0.08)	
Gizzard shad						0.04	0.30		0.40	
						(0.04)	(0.21)		(0.40)	
Common carp					0.17	0.08	1.69		1.87	
					(0.12)	(0.08)	(1.37)		(0.70)	
River carpsucker					0.12	0.13	1.95		4.60	
					(0.08)	(0.09)	(0.53)		(2.89)	
Quillback									0.08	
									(0.08)	
Smallmouth buffalo					1.31		0.95		2.88	
					(0.58)		(0.30)		(1.37)	
Bigmouth buffalo							0.06			
							(0.04)			
Blue catfish									0.33	
									(0.24)	
Channel catfish					5.67	0.46	3.92		3.22	
					(3.88)	(0.19)	(0.70)		(1.34)	
Flathead catfish					0.51	0.21	0.12		0.19	
					(0.21)	(0.12)	(0.06)		(0.19)	
White bass					0.06		0.09		0.26	
					(0.06)		(0.05)		(0.17)	
Bluegill							0.38		1.23	
							(0.15)		(0.84)	
Largemouth bass									0.09	
									(0.09)	
White crappie							0.32		0.47	
							(0.19)		(0.30)	
Black crappie									0.08	
									(0.08)	
Freshwater drum					0.96	1.10	0.52		0.51	
					(0.32)	(0.40)	(0.18)		(0.23)	

Strata: BWCS - Backwater, contiguous, shoreline
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IMPS - Impounded, shoreline
IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 5.3.6. Mean catch-per-unit-effort and (standard error) for fishes collected by seining in the open Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Shortnose gar					0.06		0.38			
					(0.06)		(0.17)			
Skipjack herring							0.02			
							(0.02)			
Gizzard shad					0.22		22.00			
					(0.13)		(7.44)			
Threadfin shad					0.06		0.13			
					(0.06)		(0.06)			
Grass carp							0.05			
							(0.03)			
Red shiner							9.86			
							(4.93)			
Spotfin shiner							0.02			
							(0.02)			
Blacktail shiner							0.07			
							(0.04)			
Common carp							0.02			
							(0.02)			
Plains minnow							0.29			
							(0.16)			
Bighead carp							0.04			
							(0.03)			
Speckled chub					0.17		0.61			
					(0.17)		(0.20)			
Sicklefin chub					0.06		0.11			
					(0.06)		(0.08)			
Silver chub					0.06		0.29			
					(0.06)		(0.09)			
Emerald shiner					1.22		11.95			
					(0.32)		(2.83)			
River shiner					1.33		2.80			
					(0.46)		(0.84)			
Ghost shiner							0.04			
							(0.04)			
Silverband shiner					0.06		0.11			
					(0.06)		(0.09)			
Channel shiner					0.28		0.57			
					(0.19)		(0.20)			
Bullhead minnow							3.75			
							(1.50)			
River carpsucker							8.11			
							(3.02)			
Quillback							0.09			
							(0.09)			
Smallmouth buffalo							0.05			
							(0.04)			
Channel catfish					0.22		0.63			
					(0.13)		(0.18)			
Flathead catfish							0.02			
							(0.02)			
Western mosquitofish							0.20			
							(0.12)			
White bass							0.11			
							(0.06)			
Orangespotted sunfish					0.06		0.55			
					(0.06)		(0.23)			
Bluegill					0.11		0.46			
					(0.08)		(0.15)			
Longear sunfish							0.05			
							(0.03)			

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IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 5.3.6. Mean catch-per-unit-effort and (standard error) for fishes collected by seining in the open Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Sauger							0.04			
							(0.03)			
Freshwater drum					0.78		4.25			
					(0.34)		(0.88)			

Strata:
BWCS - Backwater, contiguous, shoreline
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IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 5.3.7. Mean catch-per-unit-effort and (standard error) for fishes collected by bottom trawling in the open Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Shovelnose sturgeon					0.68		0.36			
					(0.34)		(0.20)			
Goldeye					0.16					
					(0.09)					
Mooneye					0.84		0.18			
					(0.58)		(0.18)			
Skipjack herring					0.05					
					(0.05)					
Gizzard shad					0.16			0.08		
					(0.16)			(0.08)		
Speckled chub					0.79		0.64			
					(0.31)		(0.45)			
Sicklefin chub					0.68		0.27			
					(0.38)		(0.19)			
Silver chub					0.16		0.27			
					(0.12)		(0.19)			
Channel shiner							0.36			
							(0.36)			
River carpsucker							0.27			
							(0.27)			
Blue sucker							0.09			
							(0.09)			
Blue catfish					2.58		0.45			
					(0.99)		(0.21)			
Channel catfish					8.00		2.64	0.08		
					(3.00)		(0.97)	(0.08)		
Freckled madtom					0.05					
					(0.05)					
Flathead catfish							0.09			
							(0.09)			
White bass					0.05		0.09			
					(0.05)		(0.09)			
Sauger					0.26		0.09			
					(0.21)		(0.09)			
Freshwater drum					2.68		0.27			
					(1.32)		(0.14)			

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IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 5.3.8. Mean catch-per-unit-effort and (standard error) for fishes collected by gill netting in the open Mississippi River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Shovelnose sturgeon						3.13	0.14			
						(1.59)	(0.10)			
Paddlefish							0.10			
							(0.07)			
Longnose gar							0.10		0.24	
							(0.07)		(0.24)	
Shortnose gar						0.30	5.56		14.21	
						(0.20)	(1.60)		(5.44)	
Bowfin							0.10		0.22	
							(0.07)		(0.22)	
Goldeye						0.63	2.92		11.98	
						(0.35)	(0.88)		(7.61)	
Skipjack herring							0.69		1.22	
							(0.40)		(0.63)	
Gizzard shad						4.41	20.99		48.22	
						(3.87)	(5.75)		(23.28)	
Common carp							0.46		1.47	
							(0.18)		(0.59)	
River carpsucker						0.26	0.64		2.82	
						(0.26)	(0.32)		(1.22)	
Quillback							0.05			
							(0.05)			
Smallmouth buffalo							0.47			
							(0.28)			
Bigmouth buffalo							1.19		0.23	
							(0.45)		(0.23)	
Black buffalo							0.05			
							(0.05)			
Shorthead redhorse									0.89	
									(0.89)	
Blue catfish						3.67	0.35		0.68	
						(1.53)	(0.18)		(0.45)	
Channel catfish							1.48		2.54	
							(0.52)		(1.51)	
Flathead catfish							0.04		0.45	
							(0.04)		(0.45)	
White bass							0.33		0.44	
							(0.21)		(0.44)	
Yellow bass							0.23		0.45	
							(0.11)		(0.45)	
Striped bass									0.23	
									(0.23)	
Longear sunfish							0.04			
							(0.04)			
Spotted bass									0.29	
									(0.29)	
Largemouth bass							0.05			
							(0.05)			
White crappie							0.04			
							(0.04)			
Sauger						0.30	0.35		1.14	
						(0.20)	(0.13)		(0.72)	
Freshwater drum						5.32	1.62		35.03	
						(3.39)	(0.56)		(23.21)	

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TRI - Tributary mouth
TWZ - Tailwater

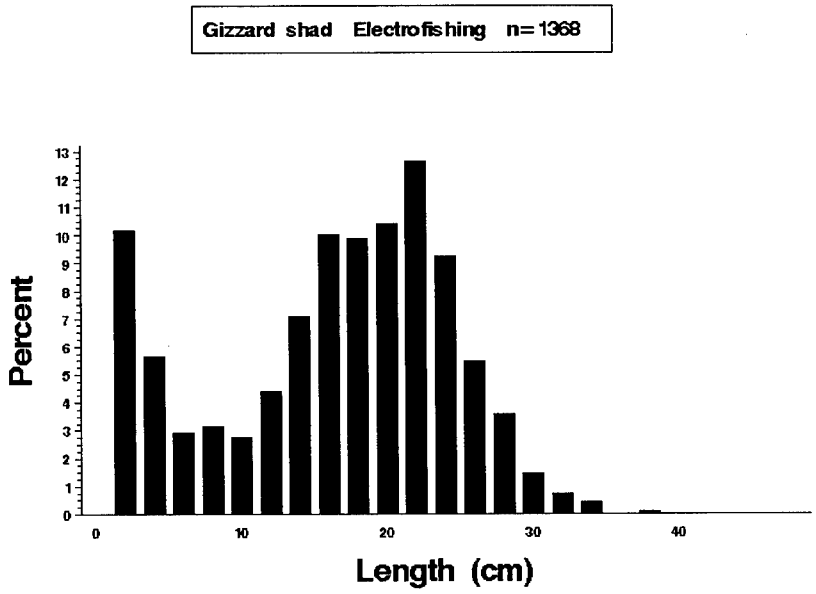

Figure 5.2. Length distributions (*length*) as a percentage of catch (*percent*) for gizzard shad (*Dorosoma cepedianum*) collected by electrofishing in the Upper Mississippi River Open Reach during 1994.

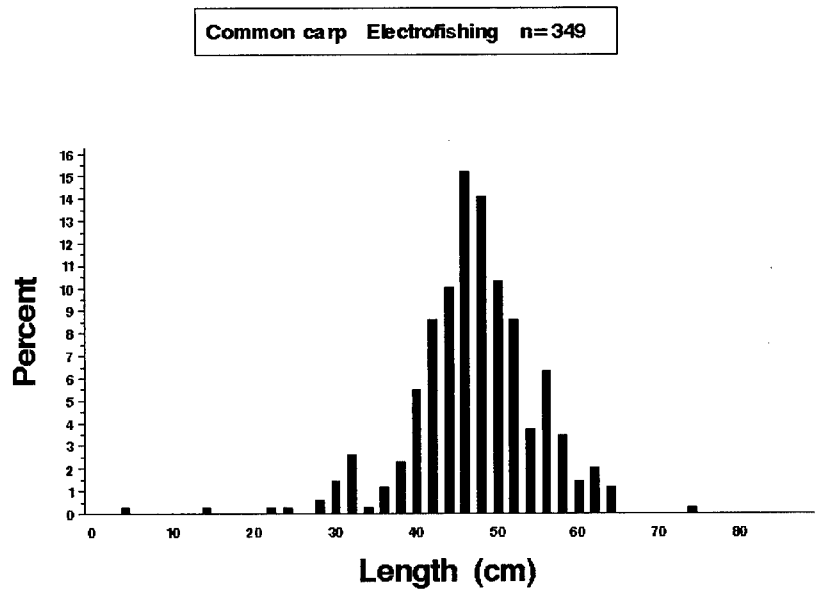

Figure 5.3. Length distributions (*length*) as a percentage of catch (*percent*) for common carp (*Cyprinus carpio*) collected by electrofishing in the Upper Mississippi River Open Reach during 1992.

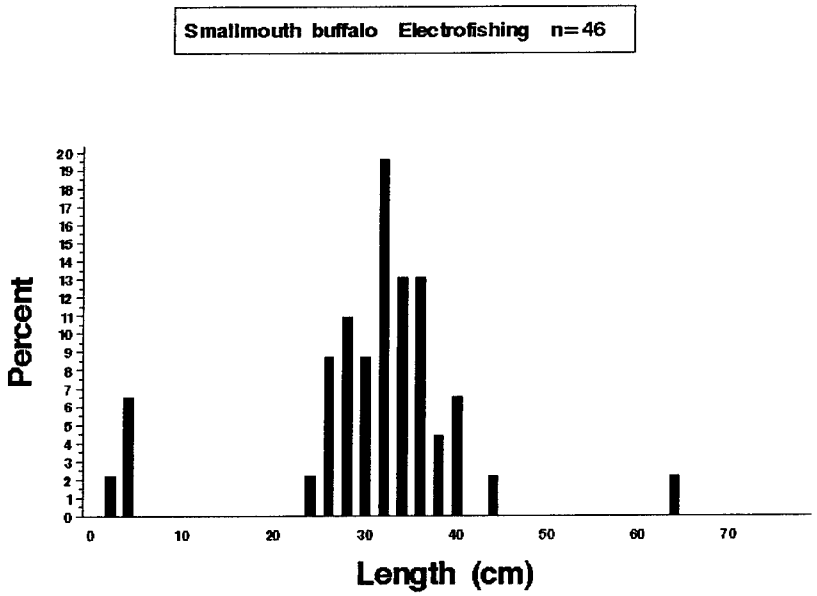

Figure 5.4. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by electrofishing in the Upper Mississippi River Open Reach during 1992.

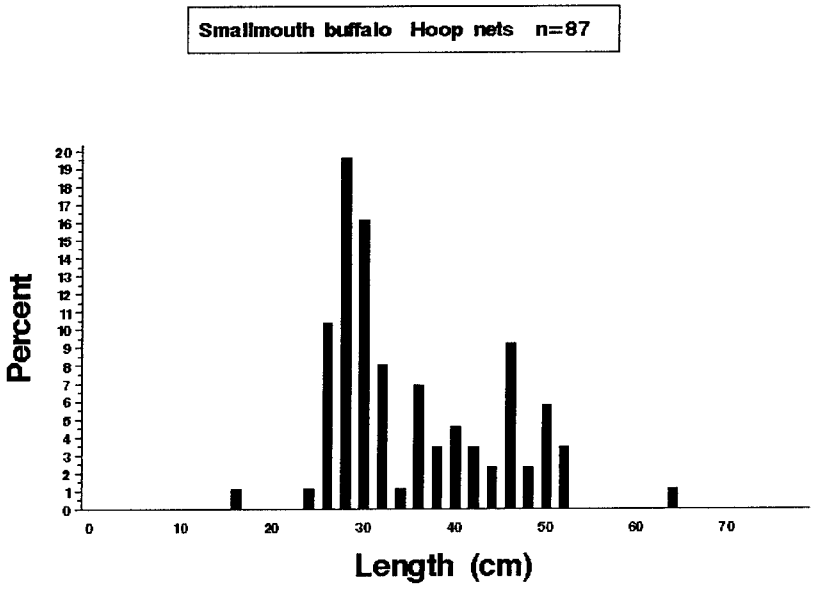

Figure 5.5. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by large and small hoop netting in the Upper Mississippi River Open Reach during 1992.

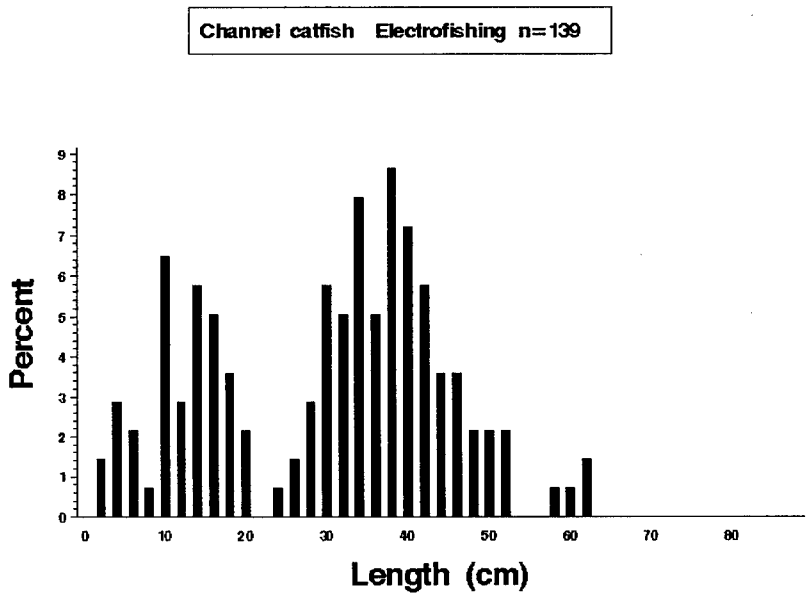

Figure 5.6. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by electrofishing in the Upper Mississippi River Open Reach during 1992.

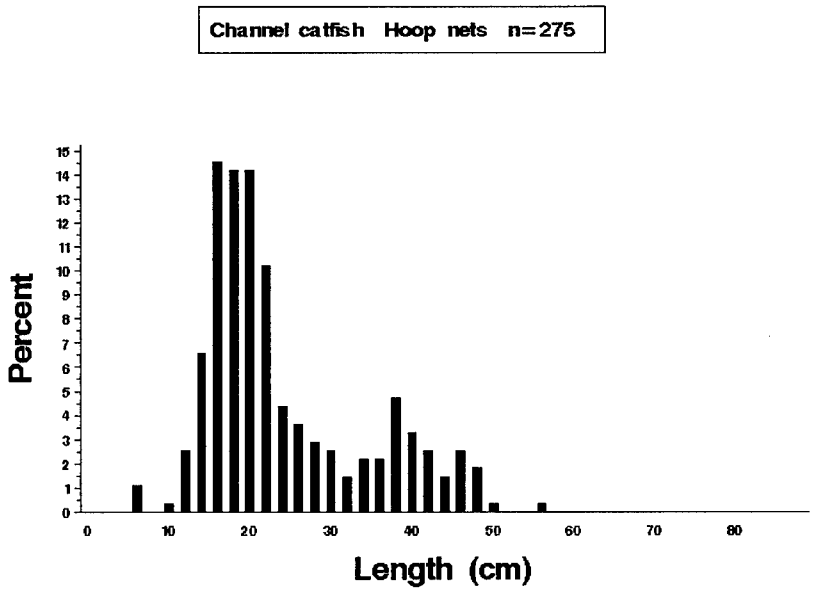

Figure 5.7. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by large and small hoop netting in the Upper Mississippi River Open Reach during 1992.

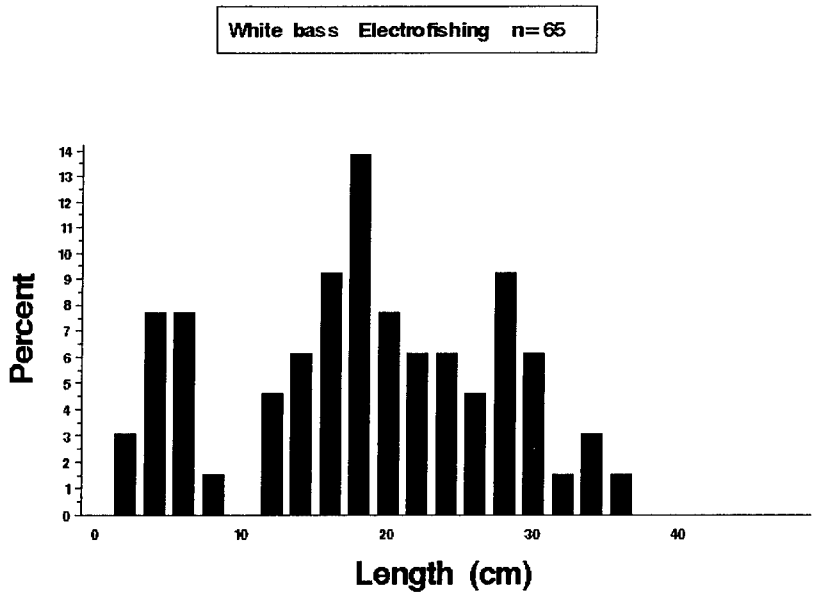

Figure 5.8. Length distributions (*length*) as a percentage of catch (*percent*) for white bass (*Morone chryops*) collected by electrofishing in the Upper Mississippi River Open Reach during 1992.

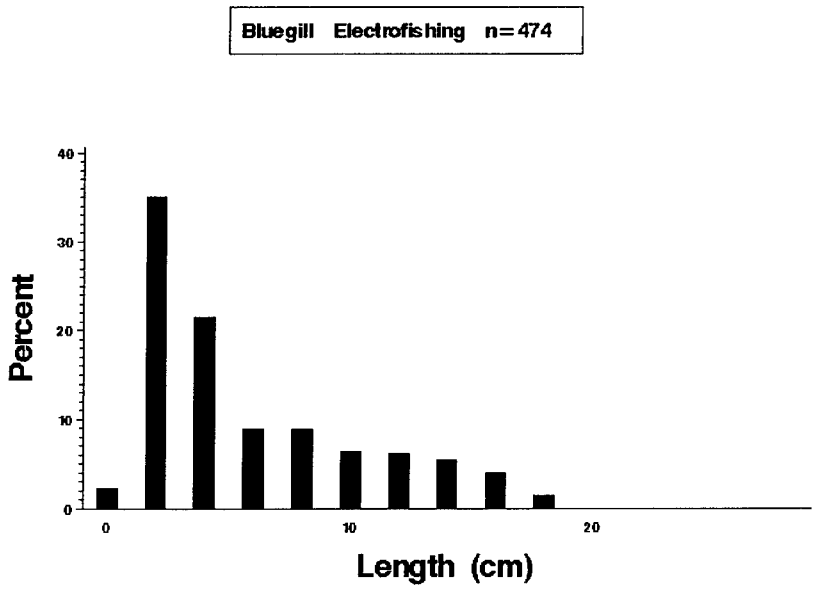

Figure 5.9. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by electrofishing in the Upper Mississippi River Open Reach during 1992.

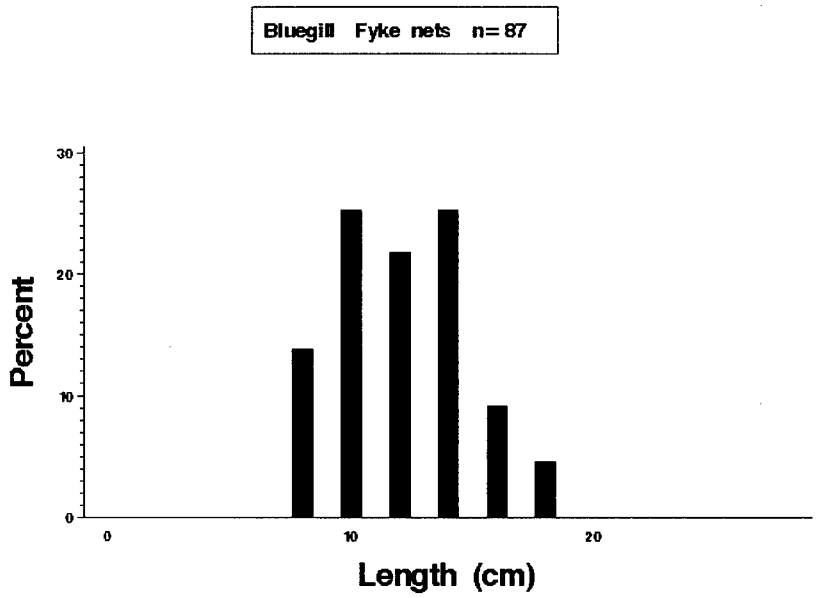

Figure 5.10. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by fyke netting in the Upper Mississippi River Open Reach during 1992.

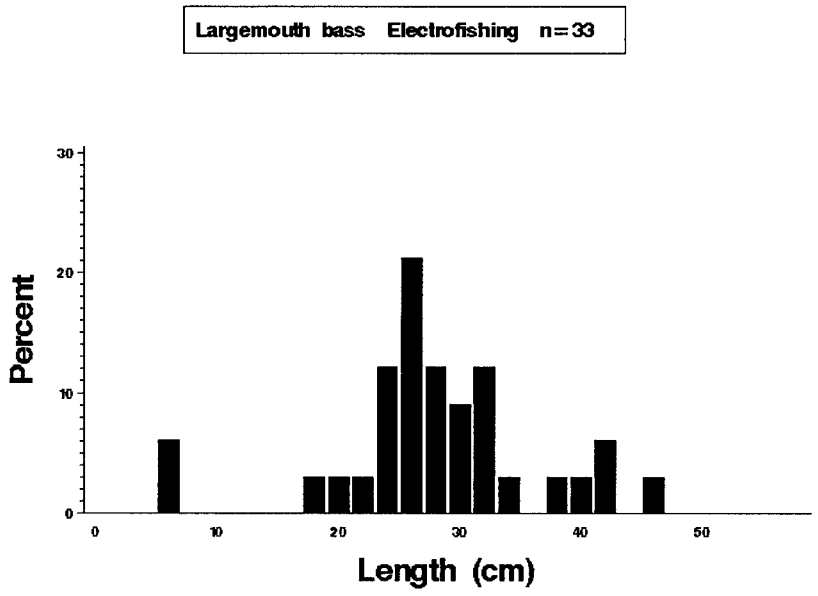

Figure 5.11. Length distributions (*length*) as a percentage of catch (*percent*) for largemouth bass (*Micropterus salmoides*) collected by fyke netting in the Upper Mississippi River Open Reach during 1992.

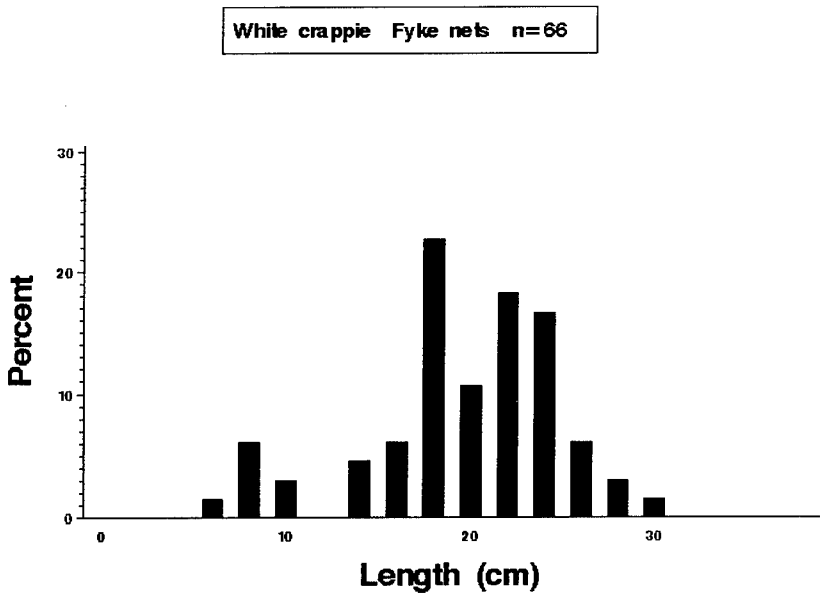

Figure 5.12. Length distributions (*length*) as a percentage of catch (*percent*) for white crappie (*Pomoxis annularus*) collected by fyke netting in the Upper Mississippi River Open Reach during 1992.

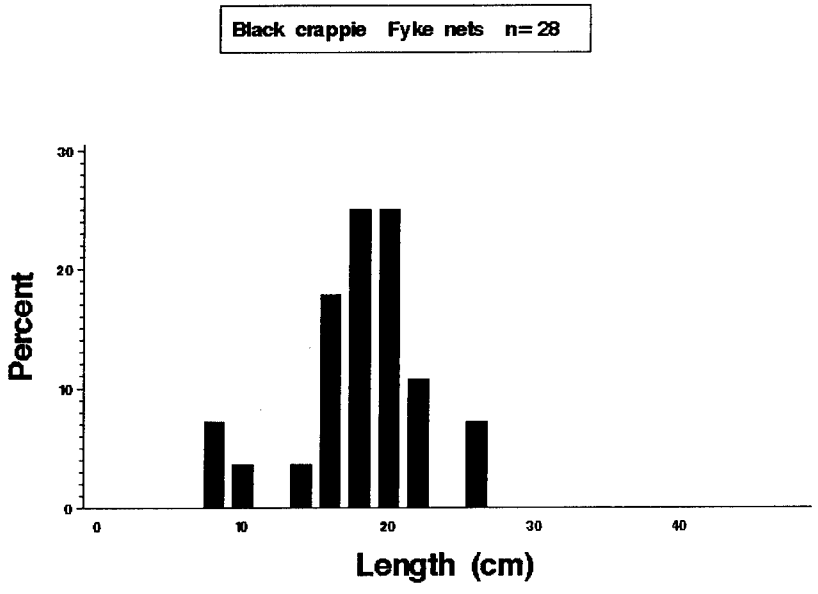

Figure 5.13. Length distributions (*length*) as a percentage of catch (*percent*) for black crappie (*Pomoxis nigromaculatus*) collected by fyke netting in the Upper Mississippi River Open Reach during 1992.

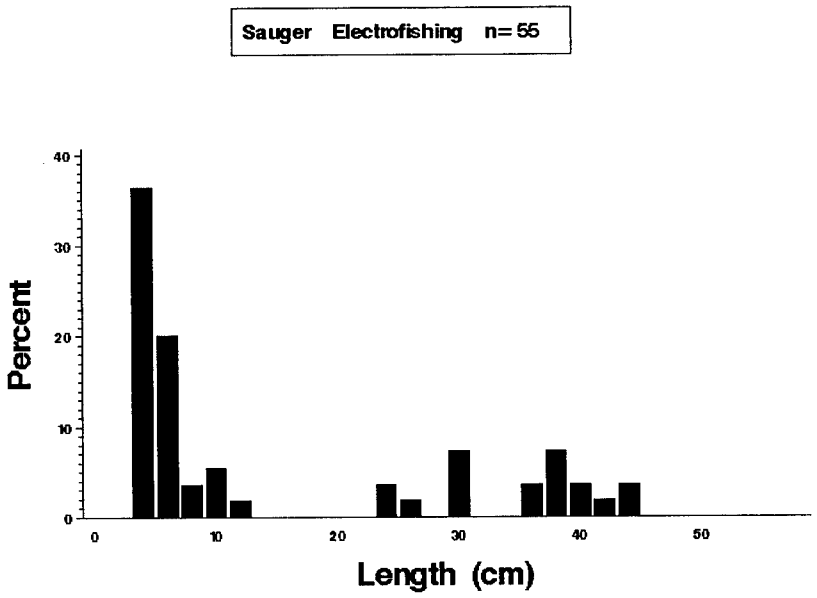

Figure 5.14. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by electrofishing in the Upper Mississippi River Open Reach during 1992.

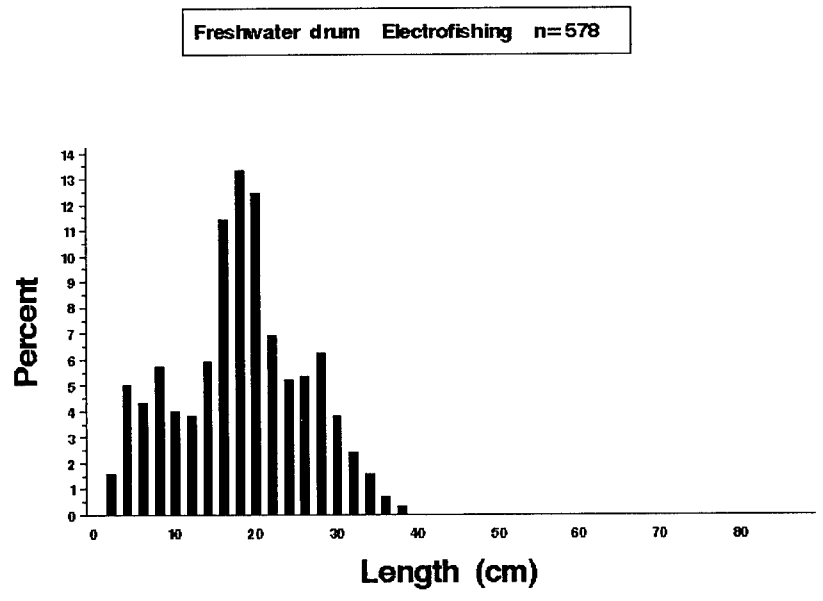

Figure 5.15. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by electrofishing in the Upper Mississippi River Open Reach during 1992.

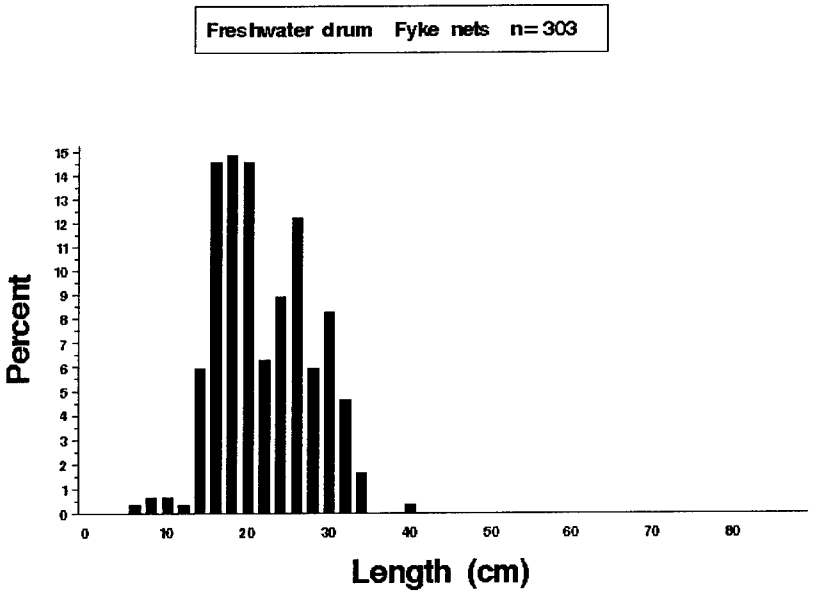

Figure 5.16. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by fyke netting in the Upper Mississippi River Open Reach during 1992.

Chapter 6. La Grange Pool, Illinois River

by

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Hydrograph

Illinois River levels at Havana, Illinois, were representative of conditions on La Grange Pool in 1992 (Figure 6.1). River levels were below average from February through June and fluctuated throughout spring. These low, fluctuating river levels were probably less than ideal for reproduction and recruitment of many fish species. River levels began rising in early July and peaked in early August, only to decline by midmonth. Another rise occurred in September, but levels had declined by early October. Both of these short periods of higher water enabled us to sample backwaters that had been difficult to sample when river levels were low. From early to mid-November, river levels rose about 9.8 feet and remained high throughout December. The U.S. Army Corps of Engineers discharge data were obtained from the Environmental Management Technical Center (Wlosinski et al. 1995).

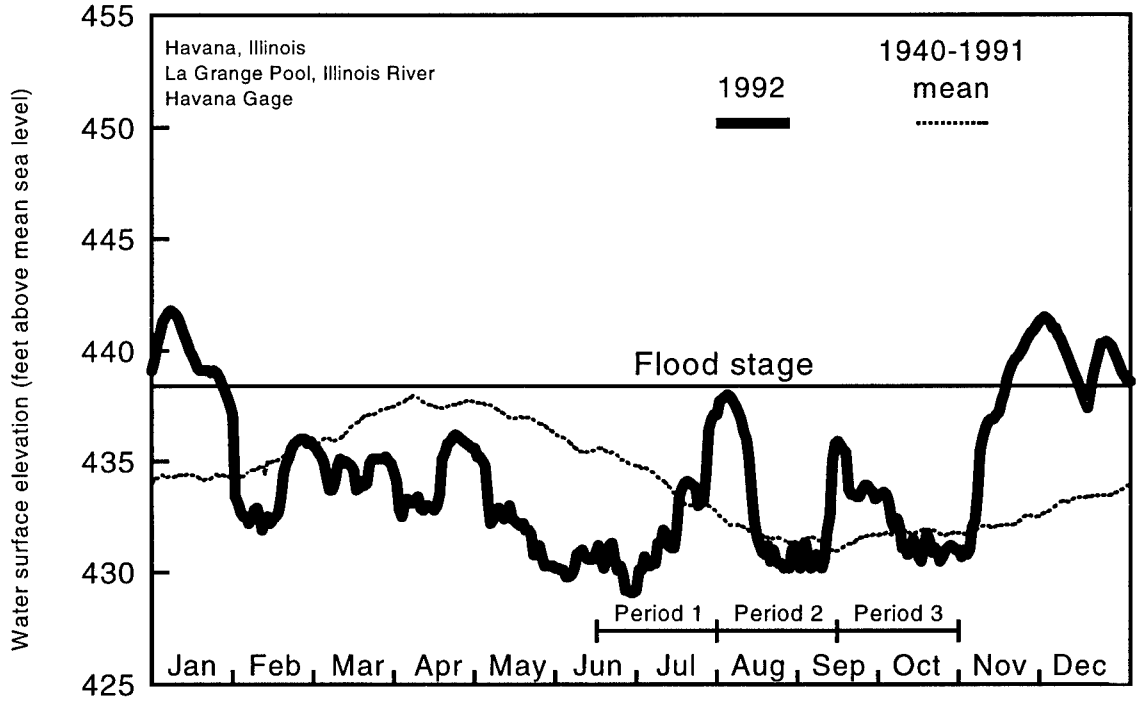

Figure 6.1. Daily water surface elevation from Havana Gage for La Grange Pool, Illinois River, during 1992 and mean elevation since 1940. The U.S. Army Corps of Engineers discharge data were obtained from the Environmental Management Technical Center (Wlosinski et al. 1995).

Summary of Sampling Effort

We made 373 collections at fixed sites in 1992—118 in period 1, 127 in period 2, and 128 in period 3 (Table 6.1). We made 110 more collections in 1992 than in 1991 because of the addition of new backwater sites. Low river levels hindered sampling at backwater sites during all three periods, but we were able to complete some backwater sampling during each period.

Total Catch by Gear

Historical records indicate 115 fish species and three hybrid crosses have been collected from La Grange Pool since the late 1800s (Smith 1979). During 1992, we collected 32,473 fish representing 56 species and three hybrid crosses (Table 6.2). Six species and one hybrid collected in 1992 were new records for Long Term Resource Monitoring Program (LTRMP) sampling in La Grange Pool (chestnut lamprey, paddlefish, bluntnose minnow, fathead minnow, smallmouth bass, white perch, and northern pike × muskellunge). The five most abundant species numerically were gizzard shad (8,212), common carp (5,569), emerald shiner (4,070), bluegill (3,285), and freshwater drum (1,905). Total species collected by gear type, excluding hybrids, were 34 by day electrofishing, 45 by night electrofishing, 37 by fyke netting, 38 by minnow fyke netting, 28 by seining, 18 by tandem hoop netting, and 10 by trawling. Our combined catch for 1990 through 1992 consisted of 95,271 fish representing 65 species and three hybrids.

Fixed Sampling, Mean *C/f* by Gear and Stratum

Day Electrofishing

Gizzard shad had the highest mean *C/f* (30.26) for day electrofishing (Table 6.3.1) in the BWCS stratum, followed by emerald shiner (11.67) and common carp (11.44). In the MCBU stratum, gizzard shad had the highest *C/f* (20.14), followed by common carp (9.98) and freshwater drum (8.24).

Night Electrofishing

Bluegill had the highest mean *C/f* (21.37) for night electrofishing (Table 6.3.2) in the BWCS stratum, followed by emerald shiner (17.78) and gizzard shad (13.71). For night electrofishing in the MCBU stratum, gizzard shad had the highest *C/f* (131.60), followed by freshwater drum (24.86) and common carp (9.28). Common carp had the highest *C/f* (24.51) in the SCB stratum, followed by bluegill (19.82) and gizzard shad (14.07). In the TWZ stratum, common carp had the highest *C/f* (61.70), followed by gizzard shad (38.77) and smallmouth buffalo (20.14).

Fyke Net

Gizzard shad had the highest mean *C/f* (45.23) for fyke netting (Table 6.3.3) in the BWCS stratum, followed by common carp (32.39) and bluegill (31.50). Gizzard shad had the highest *C/f* (29.36) in TWZ fyke nets, followed by white bass (21.89) and bluegill (19.26).

Mini Fyke Net

For mini fyke netting in the BWCS stratum (Table 6.3.4), gizzard shad had the highest *C/f* (27.03), followed by threadfin shad (6.28) and freshwater drum (4.59). In the TWZ stratum, emerald shiner had the highest *C/f* (18.12), followed by gizzard shad (6.16) and white bass (5.39).

Tandem Hoop Net

Common carp had the highest *C/f* (28.55) for tandem hoop nets in the MCBU stratum (Table 6.3.5), followed by channel catfish (15.78) and freshwater drum (3.27). In the SCB and TWZ strata, common carp had the highest *C/f* (SCB, 18.19; TWZ, 32.81), followed by channel catfish (SCB, 4.27; TWZ, 3.63) and smallmouth buffalo (SCB, 3.68; TWZ, 2.79).

Seine

For BWCS seining (Table 6.3.6), emerald shiner had the highest *C/f* (171.17), followed by gizzard shad (133.17) and river carpsucker (17.17). Emerald shiner had the highest *C/f* (32.30) in the MCBU stratum, followed by gizzard shad (17.70) and freshwater drum (2.20). Emerald shiner also had the highest *C/f* (25.55) in the SCB stratum, followed by gizzard shad (24.73) and western mosquitofish (18.48).

Trawl

Freshwater drum (1.92) had the highest *C/f* in MCBU trawls (Table 6.3.7), followed by channel catfish (0.50) and common carp (0.38). In the CTR stratum, channel catfish had the highest *C/f* (1.00), followed by freshwater drum (0.72) and common carp (0.25). In the TWZ site, channel catfish had the highest *C/f* (0.38), followed by common carp (0.13).

Length Distributions of Selected Species

Gizzard Shad

Gizzard shad lengths from day and night electrofishing ranged from 2 to 34 cm, with about 35% of the 3,221 fish catch being 2 cm long (Figure 6.2). Two other peaks were present at 10 and 18 cm. Twenty-two gizzard shad were not measured and were not included in the length distribution.

Common Carp

The length distribution of 1,919 common carp from electrofishing (Figure 6.3) indicated abundant fish from 24 to 50 cm, with peaks at 30 and 40 cm. A small peak at 4 cm was also present. Common carp ranged from 2 to 72 cm. There were 326 fish that were not measured and were not included in the length distribution.

Smallmouth Buffalo

We collected 602 smallmouth buffalo by electrofishing (Figure 6.4); they ranged from 2 to 44 cm. These fish were fairly normally distributed, with the peak at 26 cm.

Hoop net collections of 226 smallmouth buffalo illustrated a bimodal length distribution, with peaks at 26 and 38 cm (Figure 6.5). Smallmouth buffalo less than 22 cm were not collected by hoop netting during 1992.

Channel Catfish

The length distribution of 269 channel catfish collected by electrofishing illustrated a large peak between 18 and 30 cm, with a smaller peak between 38 and 44 cm (Figure 6.6). Lengths ranged from 2 to 64 cm.

Of the 620 channel catfish collected by hoop netting (Figure 6.7), 85% were between 14 and 24 cm long. Their lengths ranged from 10 to 56 cm.

Northern Pike

No northern pike were collected in La Grange Pool during 1992 (Table 6.2).

White Bass

Of the 261 white bass collected by electrofishing (Figure 6.8), 80% were between 18 and 30 cm long, with the remainder between 4 and 16 cm long.

Bluegill

Of the 1,790 bluegill collected by electrofishing (Figure 6.9), 85% were between 8 and 18 cm, with a small peak between 4 and 6 cm.

We collected 1,129 bluegill from fyke nets in 1992 (Figure 6.10). The distribution was similar to that for electrofishing (Figure 6.9) but lacked fish less than 8 cm. An additional 125 fish were not measured and were not included in the length distribution.

Largemouth Bass

The electrofishing length distribution for 592 largemouth bass (Figure 6.11) indicated fish were distributed from 2 to 48 cm. Peaks were evident at 6, 22, 30, and 36 cm, with 90% of the largemouth bass collected longer than 18 cm.

White Crappie

We collected 148 white crappie from fyke nets (Figure 6.12). Their lengths ranged from 8 to 32 cm. More than 86% were between 14 and 22 cm.

Black Crappie

We collected 398 black crappie in fyke nets in 1992 (Figure 6.13). Lengths ranged from 12 to 28 cm. These fish were almost normally distributed, with the peak at 16 cm.

Sauger

We collected 20 sauger during electrofishing in 1992 (Table 6.2); they ranged in length from 20 to 42 cm. Because of the small sample size, length distributions are not included in this report.

Walleye

No walleye were collected by LTRMP by electrofishing in La Grange Pool during 1992 (Table 6.2).

Freshwater Drum

More than 56% of the 987 freshwater drum in the electrofishing length distribution (Figure 6.14) of fish were between 2 and 10 cm, with the peak at 10 cm. Another smaller peak was present at 18 cm. Lengths ranged from 2 to 60 cm.

We collected 361 freshwater drum in fyke nets in 1992. They ranged from 10 to 40 cm. The major peak in the distribution was between 18 and 22 cm, with a smaller peak at 30 cm.

Table 6.1. Allocation of fish sampling effort among strata by the Long Term Resource Monitoring Program in the La Grange Pool of the Illinois River during 1992. Table entries are numbers of successfully completed standardized monitoring collections.

Sampling period = 1: June 15 - July 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	CTR	TWZ	TOTAL
Day electrofishing	12			4						16
Fyke net	12								2	14
Tandem hoop net			8	4					2	14
Mini fyke net	10								2	12
Night electrofishing	10		8	4					2	24
Seine	2		12	4						18
Trawling				8				12		20
SUBTOTAL	46	0	28	24	0	0	0	12	8	118

Sampling period = 2: August 1 - September 14

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	CTR	TWZ	TOTAL
Day electrofishing	12			4						16
Fyke net	12								2	14
Tandem hoop net			8	4					2	14
Mini fyke net	9								2	11
Night electrofishing	8		8	4					2	22
Seine	2		16	8						26
Trawling				8				12	4	24
SUBTOTAL	43	0	32	28	0	0	0	12	12	127

Sampling period = 3: September 15 - October 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	CTR	TWZ	TOTAL
Day electrofishing	12			4						16
Fyke net	12								2	14
Tandem hoop net			8	4					2	14
Mini fyke net	10								2	12
Night electrofishing	8		8	4					2	22
Seine	2		16	8						26
Trawling				8				12	4	24
SUBTOTAL	44	0	32	28	0	0	0	12	12	128
	133	0	92	80	0	0	0	36	32	373

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
CTR - Main channel trough.
TWZ - Tailwater.

Table 6.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1992 in the La Grange Pool of the Illinois River. See Table 6.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	H	T	TOTAL
1	Chestnut lamprey	Ichthyomyzon castaneus	-	1	-	-	-	-	-	-	-	1
2	Paddlefish	Polyodon spathula	-	-	1	-	-	-	-	-	-	1
3	Spotted gar	Lepisosteus oculatus	1	-	13	-	-	-	-	-	-	14
4	Longnose gar	Lepisosteus osseus	2	5	3	-	1	-	-	-	-	11
5	Shortnose gar	Lepisosteus platostomus	13	49	271	-	29	-	2	1	-	365
6	Bowfin	Amia calva	1	1	12	-	2	-	-	-	-	16
7	American eel	Anguilla rostrata	-	-	-	-	1	-	-	-	-	1
8	Skipjack herring	Alosa chrysochloris	9	8	23	-	9	-	26	1	1	77
9	Gizzard shad	Dorosoma cepedianum	1138	2105	1826	-	854	-	2241	46	2	8212
10	Threadfin shad	Dorosoma petenense	4	29	11	-	180	-	213	-	-	437
11	Goldfish	Carassius auratus	41	35	7	-	1	-	1	-	-	85
12	Grass carp	Ctenopharyngodon idella	-	-	-	-	1	-	-	-	-	1
13	Red shiner	Cyprinella lutrensis	7	3	-	-	2	-	153	-	-	165
14	Common carp	Cyprinus carpio	576	1669	1206	-	98	-	56	1945	19	5569
15	Goldfish x carp	Carassius auratus x C. carpio	3	1	-	-	-	-	-	2	-	6
16	Silver chub	Macrhybopsis storeriana	-	5	-	-	7	-	22	-	3	37
17	Golden shiner	Notemigonus crysoleucas	-	-	-	-	-	-	15	-	-	15
18	Emerald shiner	Notropis atherinoides	516	602	-	-	154	-	2797	-	1	4070
19	Spottail shiner	Notropis hudsonius	-	2	-	-	1	-	3	-	-	6
20	Silverband shiner	Notropis shumardi	-	-	-	-	11	-	-	-	-	11
21	Sand shiner	Notropis stramineus	-	-	-	-	-	-	4	-	-	4
22	Bluntnose minnow	Pimephales notatus	-	-	-	-	-	-	7	-	-	7
23	Fathead minnow	Pimephales promelas	-	-	-	-	2	-	-	-	-	2
24	Bullhead minnow	Pimephales vigilax	2	3	-	-	4	-	16	-	1	26
25	River carpsucker	Carpiodes carpio	186	196	282	-	4	-	107	9	1	785
26	Quillback	Carpiodes cyprinus	-	6	31	-	-	-	-	2	-	39
27	Highfin carpsucker	Carpiodes velifer	2	7	37	-	-	-	-	-	-	46
28	White sucker	Catostomus commersoni	-	1	-	-	-	-	-	-	-	1
29	Smallmouth buffalo	Ictiobus bubalus	145	457	147	-	21	-	18	226	-	1014
30	Bigmouth buffalo	Ictiobus cyprinellus	54	309	22	-	3	-	3	-	-	391
31	Black buffalo	Ictiobus niger	23	20	10	-	-	-	-	7	-	60
32	Silver redhorse	Moxostoma anisurum	-	1	1	-	-	-	-	-	-	2
33	Golden redhorse	Moxostoma erythrurum	-	1	7	-	-	-	3	1	-	12
34	Shorthead redhorse	Moxostoma macrolepidotum	18	75	463	-	3	-	3	6	-	568
35	Black bullhead	Ameiurus melas	5	3	47	-	28	-	-	2	-	85
36	Yellow bullhead	Ameiurus natalis	2	5	15	-	2	-	-	-	-	24
37	Brown bullhead	Ameiurus nebulosus	9	3	73	-	8	-	-	2	1	96
38	Channel catfish	Ictalurus punctatus	146	123	36	-	2	-	6	620	51	984
39	Flathead catfish	Pylodictis olivaris	2	17	11	-	-	-	3	13	-	46
40	Tiger muskellunge	Esox masquinongy x E. lucius	1	-	-	-	-	-	-	-	-	1

Gears: D - Day electrofishing
N - Night electrofishing
F - Fyke netting
M - Mini fyke netting
T - Trawling (4.8-m bottom trawl)
S - Seining
H - Tandem hoop netting
X - Tandem fyke netting
Y - Tandem min fyke netting

Table 6.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1992 in the La Grange Pool of the Illinois River. See Table 6.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	H	T	TOTAL
41	Blackstripe topminnow	Fundulus notatus	-	-	-	-	-	-	2	-	-	2
42	Western mosquitofish	Gambusia affinis	1	5	-	-	3	-	824	-	-	833
43	Brook silverside	Labidesthes sicculus	-	2	-	-	-	-	1	-	-	3
44	White perch	Morone americana	-	1	1	-	5	-	-	-	-	7
45	White bass	Morone chrysops	58	203	963	-	47	-	12	-	-	1283
46	Yellow bass	Morone mississippiensis	3	8	6	-	1	-	-	-	-	18
47	Green sunfish	Lepomis cyanellus	13	23	11	-	3	-	-	-	-	50
48	Warmouth	Lepomis gulosus	7	13	1	-	-	-	-	-	-	21
49	Orangespotted sunfish	Lepomis humilis	-	6	1	-	3	-	-	-	-	10
50	Bluegill	Lepomis macrochirus	507	1283	1254	-	69	-	172	-	-	3285
51	Green sunfish x bluegill	L. cyanellus x L. macrochirus	3	3	2	-	-	-	-	-	-	8
52	Smallmouth bass	Micropterus dolomieu	-	3	-	-	-	-	-	-	-	3
53	Largemouth bass	Micropterus salmoides	236	356	20	-	7	-	15	-	-	634
54	White crappie	Pomoxis annularis	83	55	148	-	39	-	4	2	-	331
55	Black crappie	Pomoxis nigromaculatus	126	153	398	-	20	-	-	1	-	698
56	Logperch	Percina caprodes	-	1	-	-	2	-	-	-	-	3
57	Sauger	Stizostedion canadense	3	17	62	-	1	-	-	2	-	85
58	Walleye	Stizostedion vitreum	-	-	1	-	-	-	-	-	-	1
59	Freshwater drum	Aplodinotus grunniens	157	830	361	-	135	-	247	103	72	1905
			4103	8704	7784	0	1763	0	6976	2991	152	32473

Gears: D - Day electrofishing
N - Night electrofishing
F - Fyke netting
M - Mini fyke netting
T - Trawling (4.8-m bottom trawl)
S - Seining
H - Tandem hoop netting
X - Tandem fyke netting
Y - Tandem min fyke netting

Table 6.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by day electrofishing in the La Grange Pool of the Illinois River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Spotted gar		0.02								
		(0.02)								
Longnose gar		0.04								
		(0.03)								
Shortnose gar		0.30			0.10					
		(0.16)			(0.10)					
Bowfin		0.03								
		(0.03)								
Skipjack herring		0.11			0.50					
		(0.07)			(0.26)					
Gizzard shad		30.26			20.14					
		(6.29)			(4.40)					
Threadfin shad					0.35					
					(0.21)					
Goldfish		0.89			0.07					
		(0.61)			(0.07)					
Red shiner		0.17								
		(0.08)								
Common carp		11.44			9.98					
		(1.62)			(1.37)					
Goldfish x carp		0.09								
		(0.05)								
Emerald shiner		11.67			1.12					
		(5.59)			(0.58)					
Bullhead minnow		0.04								
		(0.04)								
River carpsucker		4.69			0.45					
		(2.13)			(0.20)					
Highfin carpsucker		0.03			0.12					
		(0.03)			(0.12)					
Smallmouth buffalo		3.46			0.58					
		(0.77)			(0.30)					
Bigmouth buffalo		1.16			0.47					
		(0.32)			(0.32)					
Black buffalo		0.59								
		(0.17)								
Shorthead redhorse		0.24			0.84					
		(0.10)			(0.49)					
Black bullhead		0.17								
		(0.10)								
Yellow bullhead		0.08								
		(0.06)								
Brown bullhead		0.24								
		(0.12)								
Channel catfish		1.89			5.85					
		(0.42)			(1.17)					
Flathead catfish		0.02			0.11					
		(0.02)			(0.11)					
Tiger muskellunge		0.02								
		(0.02)								
Western mosquitofish		0.04								
		(0.04)								
White bass		0.82			2.38					
		(0.19)			(1.02)					
Yellow bass		0.07								
		(0.04)								
Green sunfish		0.28			0.12					
		(0.17)			(0.12)					
Warmouth		0.15								
		(0.08)								

Strata: BWCS - Backwater, contiguous, shoreline
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CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 6.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by day electrofishing in the La Grange Pool of the Illinois River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Bluegill		10.94			2.29					
		(2.80)			(1.18)					
Green sunfish x bluegill		0.06								
		(0.04)								
Largemouth bass		4.62			3.67					
		(1.22)			(1.17)					
White crappie		2.03								
		(0.63)								
Black crappie		2.58			0.08					
		(1.09)			(0.08)					
Sauger		0.05			0.10					
		(0.04)			(0.10)					
Freshwater drum		2.49			8.24					
		(0.62)			(2.57)					

Strata: BWCS - Backwater, contiguous, shoreline
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IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 6.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by night electrofishing in the La Grange Pool of the Illinois River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Chestnut lamprey							0.04			
							(0.04)			
Longnose gar		0.08					0.10			0.25
		(0.06)					(0.07)			(0.25)
Shortnose gar		0.90			0.41		0.62			0.59
		(0.49)			(0.18)		(0.18)			(0.27)
Bowfin		0.03								
		(0.03)								
Skipjack herring		0.09			0.34		0.12			
		(0.09)			(0.34)		(0.09)			
Gizzard shad		13.71			131.60		14.07			38.77
		(2.70)			(125.15)		(2.77)			(11.22)
Threadfin shad		0.06			3.20					
		(0.06)			(3.20)					
Goldfish		1.06			0.08		0.04			
		(0.43)			(0.08)		(0.04)			
Red shiner							0.14			
							(0.10)			
Common carp		12.77			9.28		24.51			61.70
		(1.70)			(2.53)		(3.39)			(22.78)
Goldfish x carp		0.04								
		(0.04)								
Silver chub		0.20								0.17
		(0.16)								(0.17)
Emerald shiner		17.78			2.38		2.42			3.55
		(10.22)			(0.76)		(0.73)			(1.93)
Spottail shiner										0.33
										(0.33)
Bullhead minnow		0.06					0.04			
		(0.04)					(0.04)			
River carpsucker		4.10			1.41		1.07			9.42
		(1.30)			(0.44)		(0.32)			(4.71)
Quillback		0.20								0.17
		(0.12)								(0.17)
Highfin carpsucker		0.20			0.10		0.06			
		(0.09)			(0.10)		(0.06)			
White sucker					0.08					
					(0.08)					
Smallmouth buffalo		3.74			0.82		7.05			20.14
		(0.93)			(0.42)		(1.38)			(13.59)
Bigmouth buffalo		1.06			0.62		7.92			6.10
		(0.34)			(0.28)		(2.36)			(3.00)
Black buffalo		0.32			0.11		0.35			0.25
		(0.10)			(0.11)		(0.13)			(0.25)
Silver redhorse		0.04								
		(0.04)								
Golden redhorse										0.17
										(0.17)
Shorthead redhorse		0.38			2.08		0.49			7.13
		(0.15)			(0.69)		(0.15)			(4.93)
Black bullhead		0.07			0.08					
		(0.05)			(0.08)					
Yellow bullhead		0.16								
		(0.08)								
Brown bullhead		0.11								
		(0.07)								
Channel catfish		1.81			4.32		1.16			1.08
		(0.44)			(0.51)		(0.34)			(1.08)
Flathead catfish		0.09			0.28		0.33			0.79
		(0.06)			(0.19)		(0.11)			(0.71)

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Table 6.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by night electrofishing in the La Grange Pool of the Illinois River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Western mosquitofish							0.27			
							(0.14)			
Brook silverside		0.06								
		(0.04)								
White perch										0.13
										(0.13)
White bass		0.96			1.51		1.09			18.98
		(0.35)			(0.56)		(0.24)			(10.63)
Yellow bass		0.10								1.08
		(0.07)								(0.82)
Green sunfish		0.47			0.11		0.08			0.74
		(0.19)			(0.11)		(0.06)			(0.66)
Warmouth		0.28					0.13			
		(0.18)					(0.07)			
Orangespotted sunfish		0.23								
		(0.13)								
Bluegill		21.37			2.39		19.82			9.41
		(4.70)			(1.19)		(4.32)			(5.90)
Green sunfish x bluegill		0.04								0.25
		(0.04)								(0.25)
Smallmouth bass		0.03								0.25
		(0.03)								(0.18)
Largemouth bass		6.46			3.32		4.85			2.32
		(1.21)			(1.25)		(0.92)			(0.94)
White crappie		0.84					0.93			0.38
		(0.28)					(0.28)			(0.24)
Black crappie		2.20			0.24		3.01			0.07
		(0.61)			(0.16)		(0.87)			(0.07)
Logperch										0.17
										(0.17)
Sauger		0.04					0.18			1.98
		(0.04)					(0.10)			(1.15)
Freshwater drum		13.11			24.86		11.71			6.08
		(2.12)			(6.70)		(3.38)			(3.34)

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TWZ - Tailwater

Table 6.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by fyke netting in the La Grange Pool of the Illinois River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Paddlefish										0.18 (0.18)
Spotted gar		0.37 (0.17)								
Longnose gar		0.08 (0.06)								
Shortnose gar		7.44 (2.06)								0.97 (0.60)
Bowfin		0.34 (0.15)								
Skipjack herring		0.41 (0.15)								1.37 (0.84)
Gizzard shad		45.23 (8.87)								29.36 (19.85)
Threadfin shad		0.22 (0.08)								0.53 (0.53)
Goldfish		0.14 (0.07)								0.32 (0.20)
Common carp		32.39 (15.62)								10.65 (4.88)
River carpsucker		7.00 (1.76)								4.09 (1.97)
Quillback		0.78 (0.29)								0.33 (0.21)
Highfin carpsucker		0.96 (0.44)								0.18 (0.18)
Smallmouth buffalo		3.79 (0.72)								1.54 (1.17)
Bigmouth buffalo		0.55 (0.12)								0.33 (0.21)
Black buffalo		0.25 (0.09)								0.18 (0.18)
Silver redhorse		0.03 (0.03)								
Golden redhorse		0.11 (0.06)								0.52 (0.36)
Shorthead redhorse		12.04 (2.78)								4.34 (2.22)
Black bullhead		1.06 (0.41)								1.73 (0.70)
Yellow bullhead		0.43 (0.22)								
Brown bullhead		1.94 (0.58)								0.69 (0.51)
Channel catfish		1.00 (0.24)								
Flathead catfish		0.31 (0.13)								
White perch										0.17 (0.17)
White bass		22.92 (3.85)								21.89 (5.95)
Yellow bass		0.16 (0.07)								
Green sunfish		0.19 (0.08)								0.65 (0.32)
Warmouth		0.03 (0.03)								
Orangespotted sunfish		0.03 (0.03)								

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Table 6.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by fyke netting in the La Grange Pool of the Illinois River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Bluegill		31.50								19.26
		(11.25)								(6.03)
Green sunfish x bluegill		0.03								0.16
		(0.03)								(0.16)
Largemouth bass		0.50								0.35
		(0.15)								(0.22)
White crappie		3.56								3.34
		(0.75)								(1.28)
Black crappie		10.27								5.33
		(2.32)								(3.18)
Sauger		0.98								4.41
		(0.36)								(2.95)
Walleye										0.16
										(0.16)
Freshwater drum		9.59								2.73
		(1.96)								(2.18)

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Table 6.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by mini fyke netting in the La Grange Pool of the Illinois River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Longnose gar		0.04 (0.04)								
Shortnose gar		1.01 (0.35)								
Bowfin		0.07 (0.05)								
American eel		0.03 (0.03)								
Skipjack herring		0.31 (0.28)								
Gizzard shad		27.03 (18.08)								6.16 (2.67)
Threadfin shad		6.28 (5.21)								0.67 (0.67)
Goldfish		0.04 (0.04)								
Grass carp		0.03 (0.03)								
Red shiner		0.07 (0.05)								
Common carp		2.88 (0.78)								2.21 (1.83)
Silver chub		0.17 (0.11)								0.34 (0.34)
Emerald shiner		1.42 (0.50)								18.12 (9.76)
Spottail shiner										0.17 (0.17)
Silverband shiner		0.39 (0.23)								
Fathead minnow										0.34 (0.34)
Bullhead minnow		0.10 (0.06)								0.17 (0.17)
River carpsucker		0.10 (0.06)								0.17 (0.17)
Smallmouth buffalo		0.69 (0.52)								0.16 (0.16)
Bigmouth buffalo		0.11 (0.08)								
Shorthead redhorse		0.10 (0.05)								
Black bullhead		0.84 (0.59)								0.49 (0.22)
Yellow bullhead		0.07 (0.05)								
Brown bullhead		0.27 (0.18)								
Channel catfish		0.07 (0.07)								
Western mosquitofish		0.10 (0.05)								
White perch										0.83 (0.55)
White bass		0.49 (0.22)								5.39 (1.71)
Yellow bass		0.03 (0.03)								
Green sunfish										0.49 (0.34)

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TWZ - Tailwater

Table 6.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by mini fyke netting in the La Grange Pool of the Illinois River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Orangespotted sunfish		0.10								
		(0.06)								
Bluegill		2.04								1.30
		(1.16)								(0.48)
Largemouth bass		0.10								0.63
		(0.06)								(0.47)
White crappie		1.28								0.16
		(0.38)								(0.16)
Black crappie		0.55								0.67
		(0.23)								(0.50)
Logperch		0.07								
		(0.07)								
Sauger										0.17
										(0.17)
Freshwater drum		4.59								0.31
		(1.58)								(0.20)

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TWZ - Tailwater

Table 6.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by tandem hoop netting in the La Grange Pool of the Illinois River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Shortnose gar							0.02			
							(0.02)			
Skipjack herring					0.04					
					(0.04)					
Gizzard shad					1.01		0.46			
					(0.57)		(0.13)			
Common carp					28.55		18.19			32.81
					(5.70)		(3.45)			(9.01)
Goldfish x carp					0.04		0.02			
					(0.04)		(0.02)			
River carpsucker					0.04		0.13			0.17
					(0.04)		(0.05)			(0.11)
Quillback										0.17
										(0.11)
Smallmouth buffalo					0.66		3.68			2.79
					(0.25)		(1.22)			(1.66)
Black buffalo							0.10			0.17
							(0.06)			(0.11)
Golden redhorse										0.08
										(0.08)
Shorthead redhorse					0.08		0.04			0.17
					(0.06)		(0.03)			(0.17)
Black bullhead										0.17
										(0.11)
Brown bullhead					0.04		0.02			
					(0.04)		(0.02)			
Channel catfish					15.78		4.27			3.63
					(6.22)		(1.45)			(1.29)
Flathead catfish					0.17		0.17			0.09
					(0.07)		(0.06)			(0.09)
White crappie							0.04			
							(0.04)			
Black crappie							0.02			
							(0.02)			
Sauger										0.17
										(0.11)
Freshwater drum					3.27		0.38			0.60
					(1.03)		(0.17)			(0.33)

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CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 6.3.6. Mean catch-per-unit-effort and (standard error) for fishes collected by seining in the La Grange Pool of the Illinois River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Shortnose gar							0.05			
							(0.03)			
Skipjack herring		0.17			0.05		0.55			
		(0.17)			(0.05)		(0.50)			
Gizzard shad		133.17			17.70		24.73			
		(100.91)			(5.45)		(9.51)			
Threadfin shad		4.17			0.90		3.86			
		(2.86)			(0.48)		(1.03)			
Goldfish							0.02			
							(0.02)			
Red shiner		1.67			0.25		3.14			
		(1.67)			(0.12)		(2.09)			
Common carp		5.67			0.10		0.45			
		(5.47)			(0.10)		(0.15)			
Silver chub					0.05		0.48			
					(0.05)		(0.20)			
Golden shiner							0.34			
							(0.25)			
Emerald shiner		171.17			32.30		25.55			
		(64.32)			(25.95)		(7.49)			
Spottail shiner		0.17			0.10					
		(0.17)			(0.10)					
Sand shiner		0.50					0.02			
		(0.50)					(0.02)			
Bluntnose minnow		0.50					0.09			
		(0.50)					(0.07)			
Bullhead minnow							0.36			
							(0.13)			
River carpsucker		17.17					0.09			
		(15.78)					(0.07)			
Smallmouth buffalo					0.15		0.34			
					(0.15)		(0.16)			
Bigmouth buffalo					0.10		0.02			
					(0.10)		(0.02)			
Golden redhorse		0.50								
		(0.34)								
Shorthead redhorse		0.50								
		(0.34)								
Channel catfish					0.25		0.02			
					(0.16)		(0.02)			
Flathead catfish					0.05		0.05			
					(0.05)		(0.03)			
Blackstripe topminnow							0.05			
							(0.03)			
Western mosquitofish		0.17			0.50		18.48			
		(0.17)			(0.15)		(5.90)			
Brook silverside		0.17								
		(0.17)								
White bass		0.33			0.10		0.18			
		(0.33)			(0.07)		(0.09)			
Bluegill		11.33			0.25		2.25			
		(9.78)			(0.12)		(0.48)			
Largemouth bass		1.17			0.20		0.09			
		(1.17)			(0.12)		(0.04)			
White crappie							0.09			
							(0.05)			
Freshwater drum		0.17			2.20		4.59			
		(0.17)			(1.84)		(0.84)			

Strata: BWCS - Backwater, contiguous, shoreline
BWCO - Backwater, contiguous, offshore
IMPS - Impounded, shoreline
IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

Table 6.3.7. Mean catch-per-unit-effort and (standard error) for fishes collected by bottom trawling in the La Grange Pool of the Illinois River using fixed-site sampling during 1992. See text for definitions of catch-per-unit-effort and standard error.

Common Name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	CTR	TRI	TWZ
Skipjack herring					0.04					
					(0.04)					
Gizzard shad					0.08					
					(0.06)					
Common carp					0.38			0.25		0.13
					(0.13)			(0.11)		(0.13)
Silver chub								0.08		
								(0.05)		
Emerald shiner								0.03		
								(0.03)		
Bullhead minnow					0.04					
					(0.04)					
River carpsucker								0.03		
								(0.03)		
Brown bullhead								0.03		
								(0.03)		
Channel catfish					0.50			1.00		0.38
					(0.13)			(0.25)		(0.18)
Freshwater drum					1.92			0.72		
					(0.58)			(0.36)		

Strata: BWCS - Backwater, contiguous, shoreline
BWCO - Backwater, contiguous, offshore
IMPS - Impounded, shoreline
IMPO - Impounded, offshore
MCBU - Main channel border, unstructured
MCBW - Main channel border, wing dam
SCB - Side channel border
CTR - Main channel trough
TRI - Tributary mouth
TWZ - Tailwater

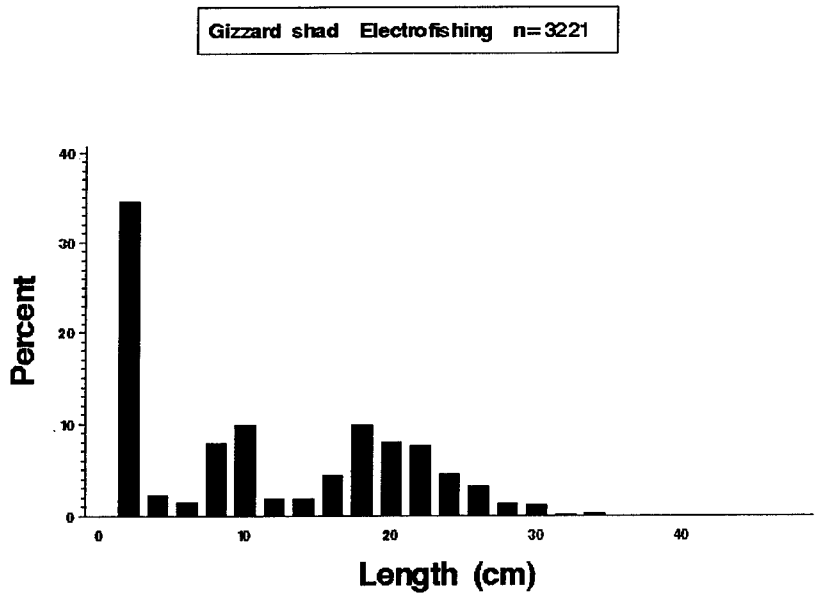

Figure 6.2. Length distributions (*length*) as a percentage of catch (*percent*) for gizzard shad (*Dorosoma cepedianum*) collected by electrofishing in the Illinois River, La Grange Pool during 1992.

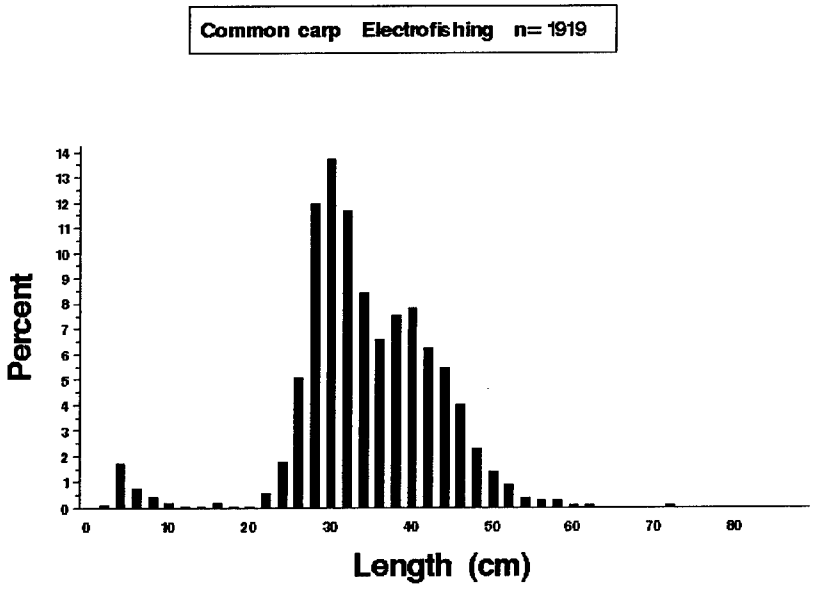

Figure 6.3. Length distributions (*length*) as a percentage of catch (*percent*) for common carp (*Cyprinus carpio*) collected by electrofishing in the Illinois River, La Grange Pool during 1992.

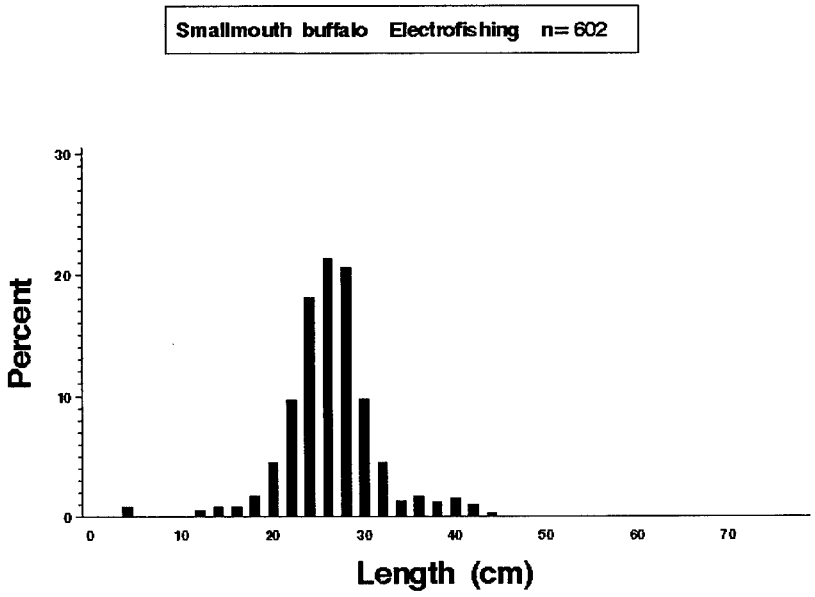

Figure 6.4. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by electrofishing in the Illinois River, La Grange Pool during 1992.

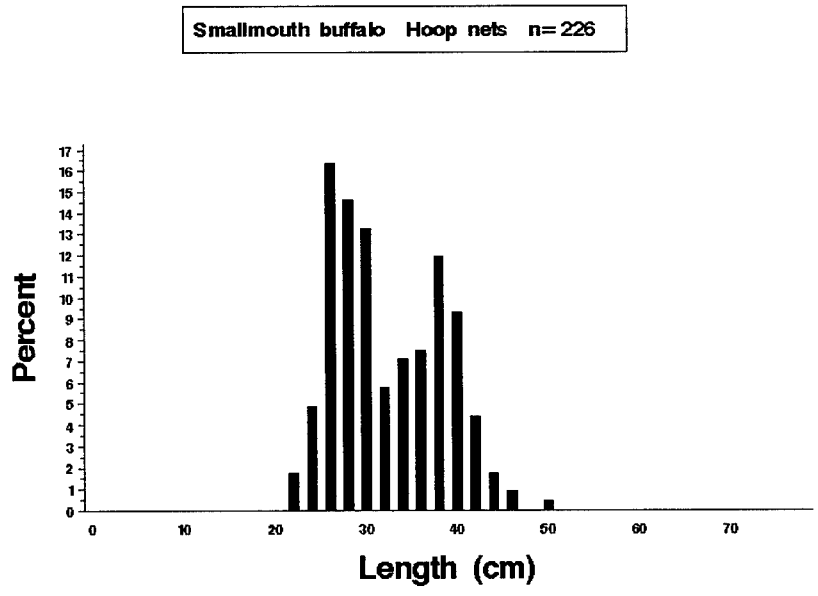

Figure 6.5. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by large and small hoop netting in the Illinois River, La Grange Pool during 1992.

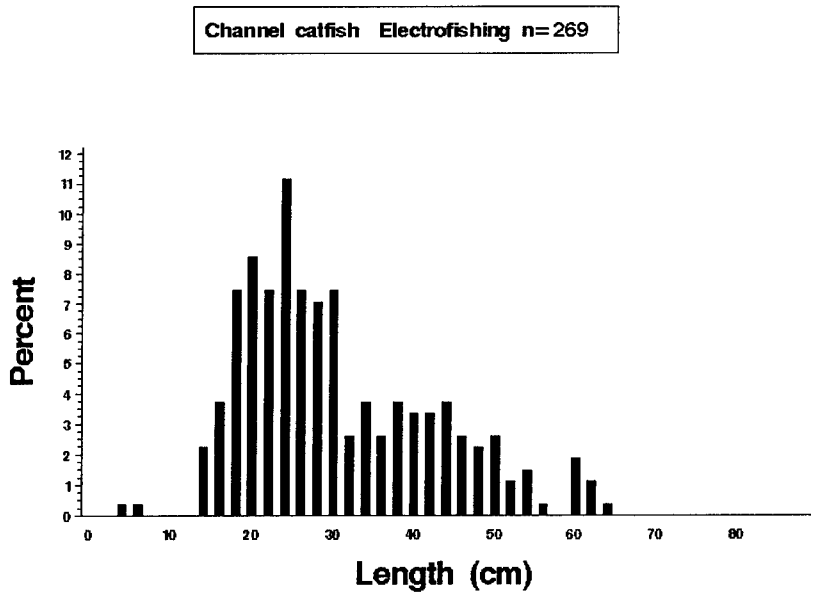

Figure 6.6. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by electrofishing in the Illinois River, La Grange Pool during 1992.

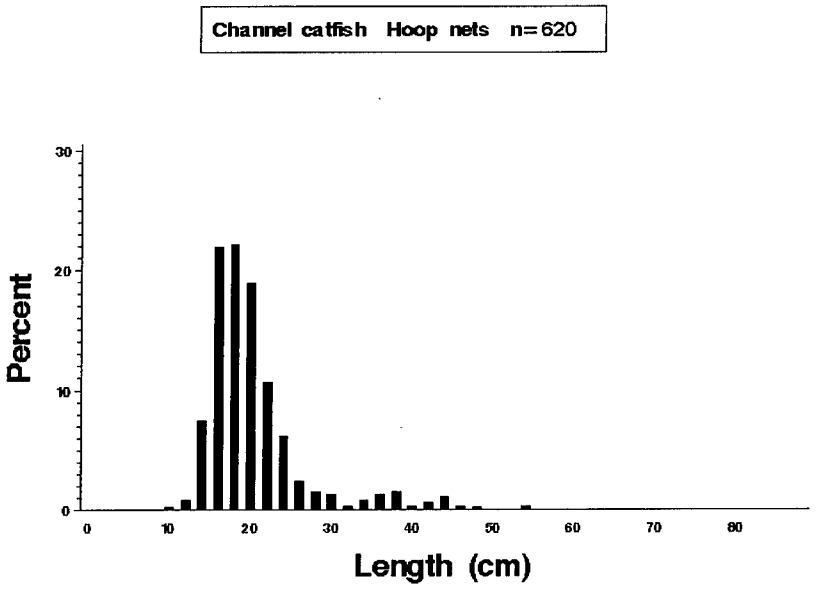

Figure 6.7. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by large and small hoop netting in the Illinois River, La Grange Pool during 1992.

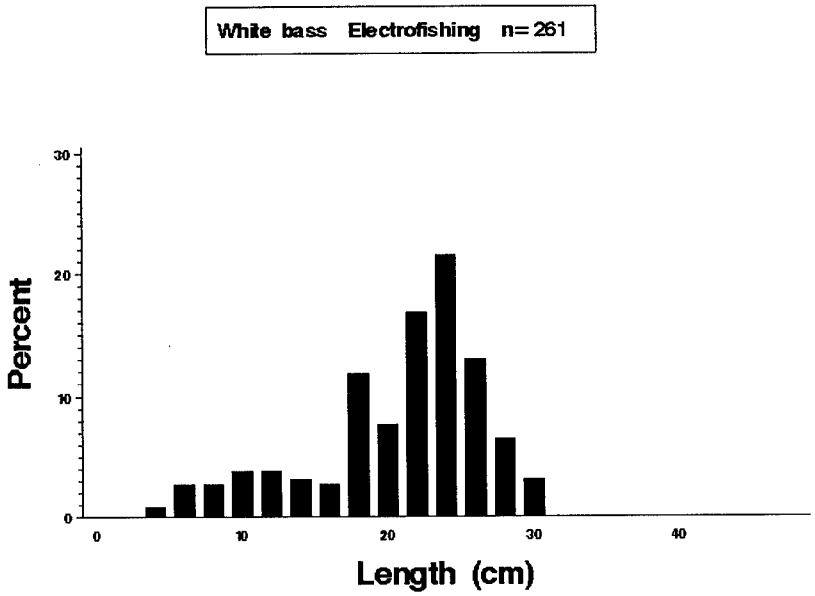

Figure 6.8. Length distributions (*length*) as a percentage of catch (*percent*) for white bass (*Morone chryops*) collected by electrofishing in the Illinois River, La Grange Pool during 1992.

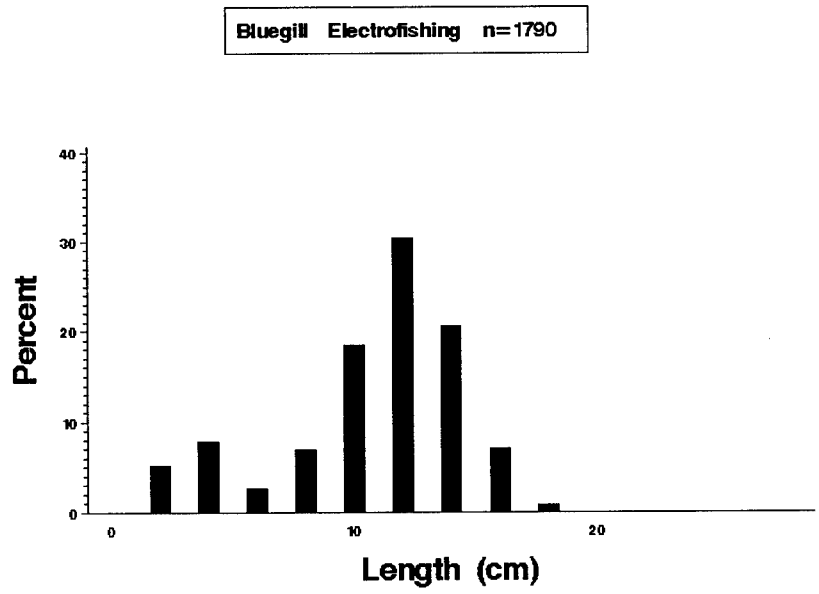

Figure 6.9. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by electrofishing in the Illinois River, La Grange Pool during 1992.

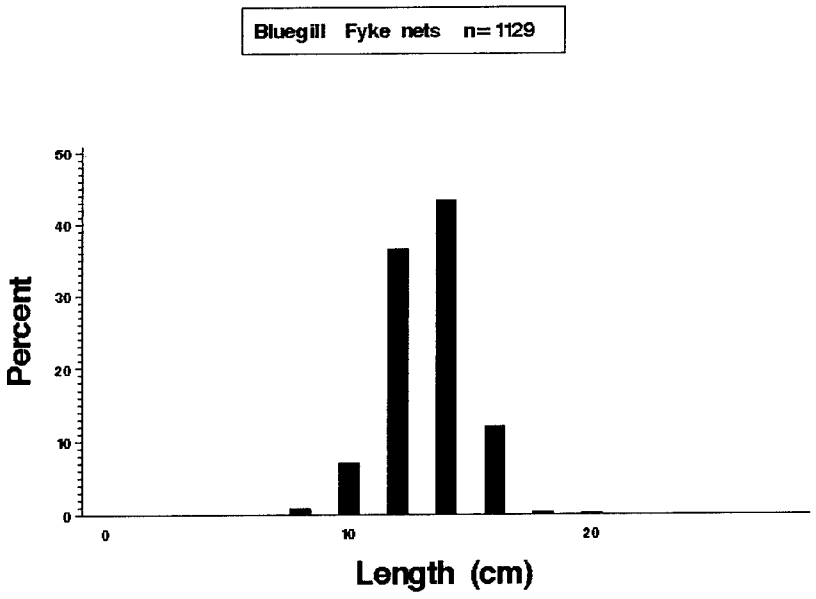

Figure 6.10. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by fyke netting in the Illinois River, La Grange Pool during 1992.

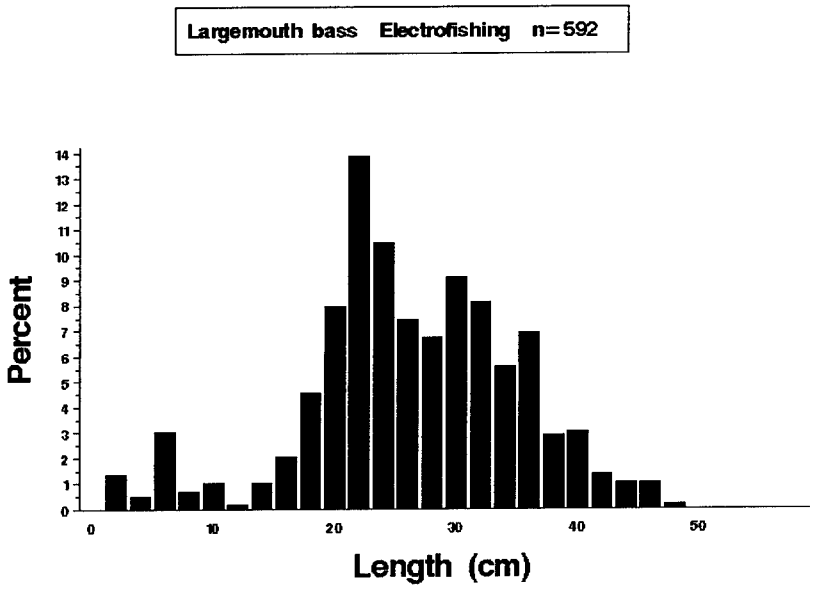

Figure 6.11. Length distributions (*length*) as a percentage of catch (*percent*) for largemouth bass (*Micropterus salmoides*) collected by electrofishing in the Illinois River, La Grange Pool during 1992.

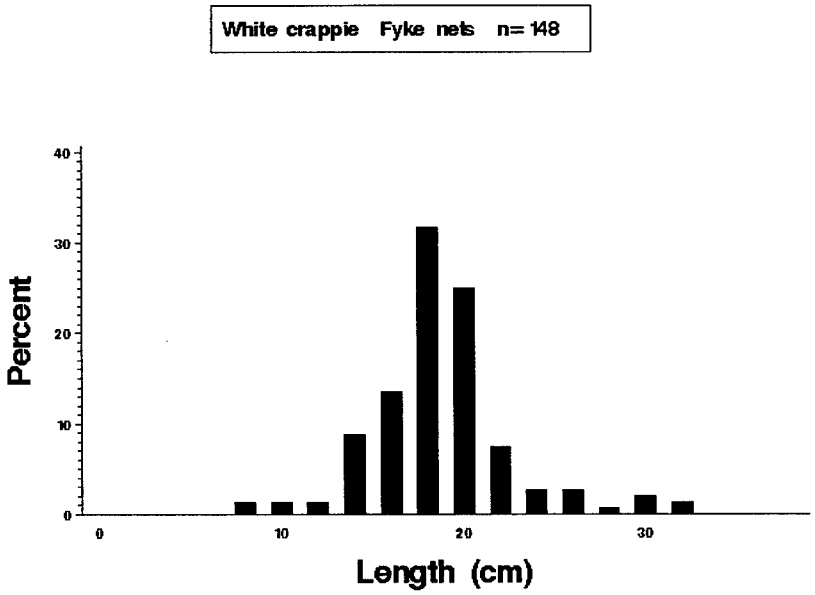

Figure 6.12. Length distributions (*length*) as a percentage of catch (*percent*) for white crappie (*Pomoxis annularus*) collected by fyke netting in the Illinois River, La Grange Pool during 1992.

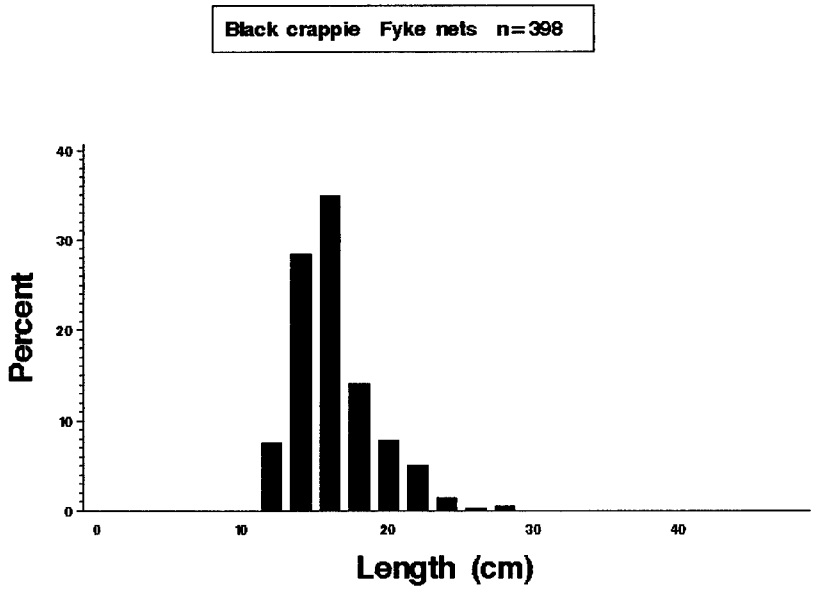

Figure 6.13. Length distributions (*length*) as a percentage of catch (*percent*) for black crappie (*Pomoxis nigromaculatus*) collected by fyke netting in the Illinois River, La Grange Pool during 1992.

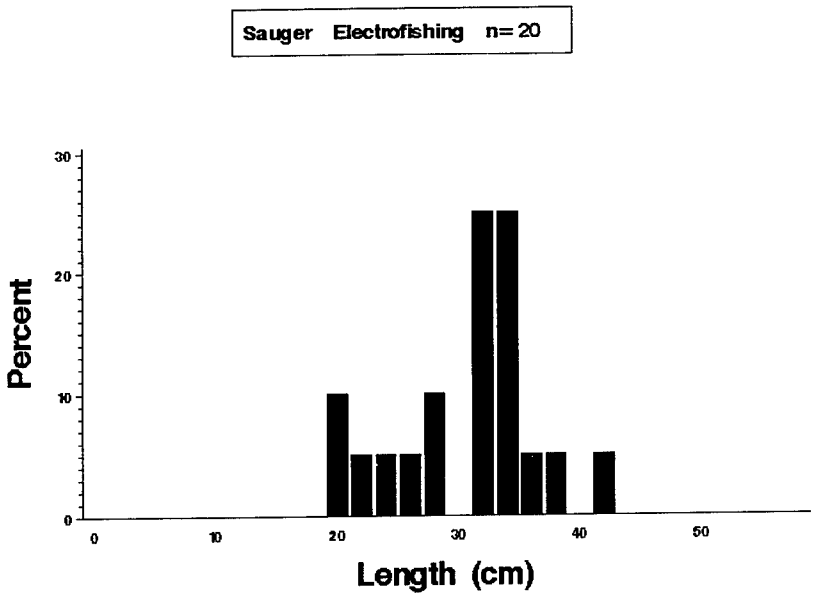

Figure 6.14. Length distributions (*length*) as a percentage of catch (*percent*) for sauger (*Stizostedion canadense*) collected by electrofishing in the Illinois River, La Grange Pool during 1992.

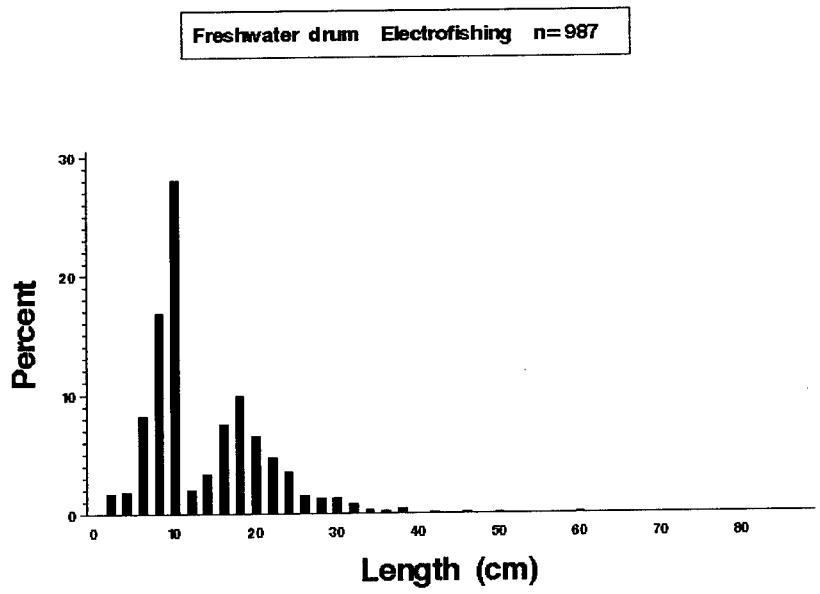

Figure 6.15. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by electrofishing in the Illinois River, La Grange Pool during 1992.

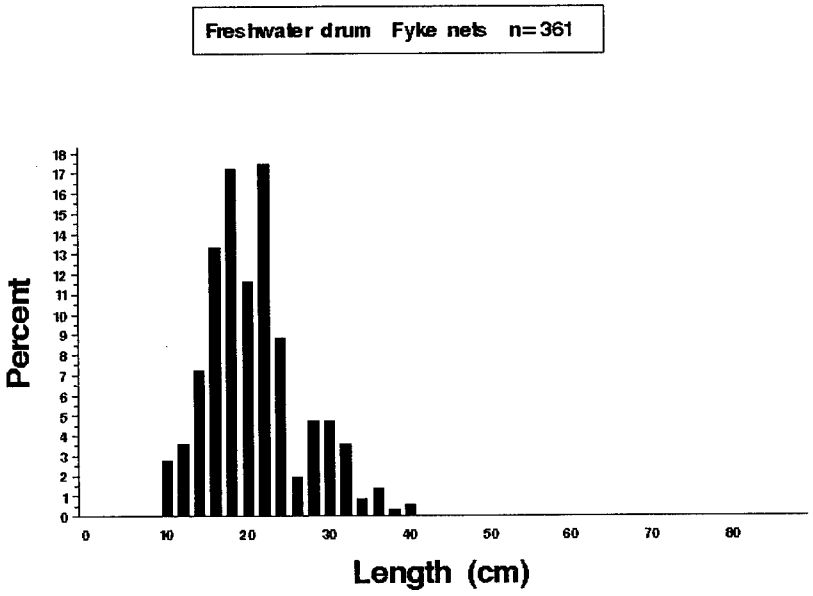

Figure 6.16. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by fyke netting in the Illinois River, La Grange Pool during 1992.

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13. ABSTRACT (Maximum 200 words)

The Long Term Resource Monitoring Program (LTRMP) completed 2,221 collections of fishes from stratified random and permanently fixed sampling locations in six study reaches of the Upper Mississippi River System during 1992. Collection methods included day and night electrofishing, hoop netting, fyke netting (two net sizes), gill netting, seining, and trawling in select aquatic area classes. The six LTRMP study areas are Pools 4 (excluding Lake Pepin), 8, 13, and 26 of the Upper Mississippi River, an unimpounded reach of the Mississippi River near Cape Girardeau, Missouri, and the La Grange Pool of the Illinois River. A total of 56–70 fish species were detected in each study area. For each of the six LTRMP study areas, this report contains summaries of: (1) sampling efforts in each combination of gear type and aquatic area class, (2) total catches of each species from each gear type, (3) mean catch-per-unit of gear effort statistics and standard errors for common species from each combination of aquatic area class and selected gear type, and (4) length distributions of common species from selected gear types.

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The Long Term Resource Monitoring Program (LTRMP) for the Upper Mississippi River System was authorized under the Water Resources Development Act of 1986 as an element of the Environmental Management Program. The mission of the LTRMP is to provide river managers with information for maintaining the Upper Mississippi River System as a sustainable large river ecosystem given its multiple-use character. The LTRMP is a cooperative effort by the U.S. Geological Survey, the U.S. Army Corps of Engineers, and the States of Illinois, Iowa, Minnesota, Missouri, and Wisconsin.